VETERINARY MEDICINE

APRIL 1946

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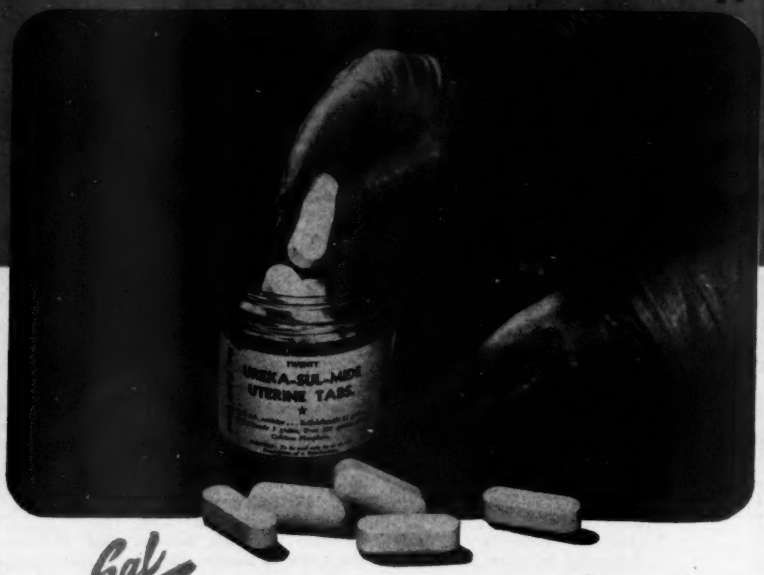
7632 S. Crandon Ave.
Chicago 49, U.S.A.

The Modern Rationale of Intrauterine Therapy



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Penicillin combined with parachlorophenol is said to be much superior to the antibiotic agent alone as a wound dressing. It may be used either as a liquid or an ointment.

Hesser finds that the painful and burning sensation caused by intramuscular injection of penicillin can be overcome if 1% of sterile procaine solution is used as solvent in place of sterile distilled water or saline. The inhibitory strength of penicillin on growth of staphylococci was not appreciably altered when the procaine was used.

The discovery of penicillin was a chance laboratory observation; not the result of systematic research. It would probably still be a laboratory curiosity but for the development of gramacidin by Dubois, which was a result of systematic research. This discovery stimulated the reinvestigation of penicillin. Gramacidin is toxic and suitable for local use only; penicillin is non-toxic hence its greater field of usefulness.

Streptomycin is said to lessen the distressing symptoms and shorten the convalescence from tularemia, 90% of which is contracted from handling carcasses of infected rabbits. Doses of 30,000 to 50,000 units subcutaneously every three hours relieve the headache, mental dullness, prostration, joint pains, muscle pains, chills and nausea within 24 hours according to Foshay and Pasternack *(J. Am. Med. Assn.*, Feb. 16, 1946). The usual duration of acute symptoms in rabbit fever is 30 days and the course of the disease four months with the treatments heretofore used.

This button indicates the wearer has been honorably discharged from the military or naval service

Vitamin A was successfully synthesized at the Massachusetts Institute of Technology during the War but announcement of the achievement was withheld until recently.

Peters, *et al. (J. Am. Med. Assn.*, Feb. 16, 1946) report good results from the use of dicoumarin, extracted from spoiled sweet hay, in the treatment of coronary thrombosis, in most cases of which there is an increased tendency for the blood to clot. The remedy can ge given over a long period without apparent harm.

Hexachlorobenzene ("666") gives promise of being the best of the acaricides yet discovered. In a 1% solution in liquid paraffin it proved highly effective against mites on rats. No preliminary washing of the skin is necessary nor does it cause any irritation. DDT in a solution of the same strength is comparatively ineffective. Against lice on guinea pigs it has proved at least as effective as DDT.

New President of Fort Dodge Laboratories

Scott L. Barrett has been named president of Fort Dodge Laboratories, Ft. Dodge, Ia.

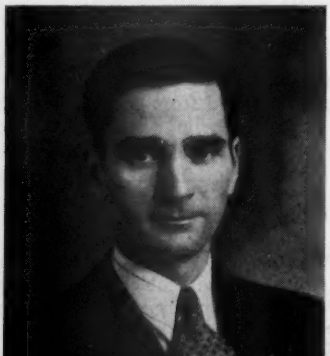
Previous to his present appointment as top executive, Mr. Barrett was general sales manager of Fort Dodge from 1919 to April, 1945, when he was made vice-president. His entire business life has been devoted to the production and merchandising of veterinary biological and pharmaceutical products, and he has an unusually wide acquaintance with members of the veterinary profession throughout the United States.

S. L. Barrett

Before coming to Fort Dodge, Mr. Barrett was manager of the Eucamphine Company, Chicago, Ill., and was previously connected with Sorby Vaccine Co. and Cutter Laboratories of Illinois, also in Chicago.

Link New Staff Member at Illinois

One of the first appointments to the faculty of the new College of Veterinary Medicine at the University of Illinois is that of Dr. Roger P. Link, who has recently been made assistant professor and assistant chief of veterinary physiology and pharmacology.



Roger P. Link

Doctor Link has had wide educational teaching background in his field. He received his D.V.M. degree at Iowa State College and his M.S. in physiology and pharmacology at the University of Chicago in 1934.

He was in charge of instruction in veterinary pharmacology at Michigan State college in 1934 and, since 1935, has served as instructor, assistant professor and associate professor of veterinary physiology at Kansas State college.

New Dean of Veterinary Medicine at O. S. U.

Appointment of Dr. Walter R. Krill as dean of Ohio State University's College of Veterinary Medicine was announced Febraury 12, 1946.

Since the death of Dean Oscar V. Brumley on January 13, 1945, Dr. Walter R. Hobbs has been doing double duty as secretary and acting dean of the college.

The new dean has two degrees from Ohio State, B.S. in agriculture (1923), and D.V.M. (1927). While working toward the latter degree he was a graduate assistant in animal husbandry.

Walter R. Krill

Doctor Krill practiced two years in Lima, Ohio. Since 1929 he has been on the staff of O.S.U., having the rank of instructor until 1935, assistant professor from 1935 to 1940, associate professor 1940-44, and professor since 1944. He also has been an associate in the department of animal husbandry of the Ohio Agricultural Experiment Station, Wooster. He was married in 1927 to Gladys P. Nesser.

Dean Krill has served as a member of the executive board of the A.V.M.A. and the Committee on Veterinary Education of the National Research Council.

The soybean furnishes 13% of the total production of edible fats and oils in this country and it is the largest single source of protein concentrate for animal feeds.

Cows Excrete Abundant Sex Hormones

Cow manure, already known to be a rich source of thiamine (B_1) has been shown by Dr. F. X. Gassner of the Colorado State College to be a prolific source of male sex hormone. He fed manure and urine of pregnant cows and extracts of these excretory products to male chicks and at only a few weeks of age they crowed and had a far more aggressive fighting spirit than mature cocks. The chicks had combs and wattles nearly 20 times as large as those of hatch mates fed the usual chick rations.

Increased Hemoglobin in Thoroughbred Blood

Macleod of Cornell University and Ponder of Mausau Hospital have discovered that the blood of "hot blooded" and "cold blooded" horses differs in the size and number of erythrocytes and in the percentage of hemoglobin.

According to their investigations the red blood cells in the blood of thoroughbreds are smaller and far more numerous than in the blood of horses of draft type. The hemoglobin concentration is lower in the cells of thoroughbreds but because of the greater number of these cells the hemoglobin content of "hot blood" is the greater.

Montreal Milk Inspection

A staff of 13 veterinarians supervise the sanitation of milking and milk production on the farms of 4,869 producers who ship milk or cream to Montreal, Quebec. The territory is divided into 10 rural districts. The inspectors are responsible for the supervision of the health of the herds, including control of mastitis and brucellosis (the tuberculin testing being done by Federal inspectors); carrying out of inquiries in the case of contagious diseases; inspection of stables, dairies, equipment and surroundings, making of score-cards (28 points out of 100 being allowed for farm buildings and 72 points for methods and conditions); supervision at milking time; collection of samples for laboratory analysis; checking layout of existing buildings on farms; inspection of ice and water supplies to be sure that they are safe for cattle and other uses; inspection of milk transport trucks; and education of producers. In 1944, a total of 14,290 inspections was made.—*Canadian J. Pub. Hlth.*

Pica—wood chewing, bone chewing—in mature cattle is commonly due to phosphorus deficiency; in young cattle it is usually due to cobalt deficiency. Phosphorus deficiency occurs most frequently in animals on pasture, cobalt deficiency usually occurs during the season when dry roughage is fed.

New York Breeding Rings

There are 54 local artificial insemination associations in 52 of the 56 agricultural counties in New York. Nearly all belong to a state association, which supplies semen for use of member associations. It is predicted that 50,000 cows will be inseminated this year from 50 bulls in one central location. It is expected that several bulls will produce semen to breed between 3000 and 4000 cows. From 150 to 200 cows have been inseminated with the semen from a single ejaculation.—*Hoard's Dairyman.*

State Meat Inspection for New York

New York state senator Thomas C. Desmond, who in 1941 sponsored the present New York law setting up sanitary standards for slaughterhouses and requiring that they be licensed, is heading an intensive campaign for the enactment of state-wide meat inspection in New York.

There are about 1600 slaughterhouses in the state and only a few have federal inspection. Only about 10% of the cities in New York have an effective meat inspection organization.

The Senator states the 1941 slaughterhouse law "has enormously helped to clean up the interiors of these buildings; but now we need to extend this inspection to include the meat itself."

Natural Breeding and Artificial Insemination of Equal Efficiency

A tabulation of the number of breeding records in dairy herds in Indiana, Louisiana, Maine, Maryland, Minnesota, Missouri, Nebraska, New York, Ohio, West Virginia and Wisconsin comprising 20,816 natural services shows that of every 100 cows bred 60 conceived to the first service the remaining 40% required from two to 15 services and 6.5% (of the whole number) failed to conceive and were disposed of as being sterile.

Records of artificial insemination from Missouri, New Jersey, New York and Wisconsin comprising 5860 inseminations give almost identical results. Sixty of each 100 cows inseminated conceived at the first trial. The remaining forty required almost exactly the same number of services as the cows in the naturally bred group and 6.6% proved sterile and were disposed of.

In an experiment by Waddington, Kenya Colony, to determine the infectivity of cattle vaccinated against rinderpest with goat virus, it developed that during the reaction to the vaccination the nasal secretions are infective to susceptible cattle by inoculation but not by natural exposure. The urine and feces of reacting animals are non-infective.

Rabies in Illinois

Sixty-five quarantines were established by the Illinois Department of Agriculture during the fiscal year ending June 30, 1945. In the same year the state health department examined 458 dogs' heads that were found to have had rabies, and 4427 treatments were supplied for persons bitten by rabid dogs or otherwise exposed to the infection.

Milk Transmission of DDT

Nine adult rats and one half-grown kitten were fed[1] solely on milk obtained from goats which received daily oral doses of 1gm. of DDT per eight to nine pounds of body weight. All ten of the animals died within two to 29 days—all exhibiting DDT tremors.

Refresher Course Postponed Indefinitely

The veterinary clinics building at the Kansas State College was destroyed by fire February 19th. All animal patients were rescued, and most of the equipment and all of the records were saved.

The refresher course for veterinarians at the Kansas veterinary school, which was scheduled to start March 4th has been indefinitely postponed since it was to have been conducted largely in the building that burned.

The clinics building was erected in 1923 at a cost of $100,000.

[1] Tilford, H. S., and Guthrie, *J. D. Science*, 102, p. 647.

The fundamental reason for lack of uniformity in regulations governing the interstate movement of livestock is lack of knowledge of livestock disease conditions in the various states and the lack of uniformity and adequacy of the veterinary service for the control of dangerous diseases of livestock which is provided in the several states.—*W. Butler.*

HAPPY EASTER!
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Buy EASTER SEALS
The National Society for Crippled Children and Adults, Inc., Chicago, Ill.

The Silver Anniversary year of the National Society for Crippled Children and Adults marks the thirteenth annual sale of Easter Seals for crippled children as a special occasion. The 1946 Easter Seal Sale will be conducted during the month before Easter, March 21 to April 21. The society has affiliated state societies in 48 states. Those needing its services include over 300,000 crippled children registered in the states and over seven million adults crippled from disease or accident. Its services to the crippled are supported by voluntary contributions through the purchase of Easter seals. The funds collected are used for needed services which do not duplicate the work of other private or public agencies.

Clinics Building, School of Veterinary Medcine, Kansas State College. Destroyed by fire Feb. 19, 1946

Tests Show 2,4-D Has No Ill Effects on Animals

Use of 2, 4-D (2, 4-dichlorophenoxyacetic acid) in spraying pastures to kill weeds has not proved injurious to cows or sheep grazing on the treated vegetation, according to results of tests by the U. S. Department of Agriculture. Even when they added the pure chemical to the grain ration of a cow at the rate of 5.5gm a day for more than 100 days, she showed no ill effects in weight, production of milk or even in appetite. The experimenters point out, however, that their conclusions apply to 2, 4-D mixed with a commonly used spray spreader called carbowax and that they do not include proprietary mixtures of 2, 4-D and other materials that might possibly be injurious to animals.

The Dual Purpose Hen

Breeding for egg production has occupied leaders in the poultry industry for a number of years and, as all know, conspicuous success in that endeavor has been attained. Meat rationing created a tremendous market for poultry meat, almost regardless of quality. The poultry industry would like to keep this market and wisely foresees that it can be done only with something more than bones to pick. Hence production of strains that supply both eggs in large quantity and a meaty carcass is receiving much attention, and seems near attainment. The angular bodies of some breeds are due to be replaced by plump carcasses even though they be small.

The poultry industry will be well advised not only to grow better birds but to improve its processing and marketing. The undrawn carcass, permeated with foul gases from the intestinal contents, has stayed on the market far too long. It is at a great disadvantage compared with the attractive ready-to-eat or ready-to-cook packages in which meat packers now offer their wares to the public. The retailing of meat has undergone revolutionary improvement in a decade. In three times that period the quality of poultry meat has deteriorated on the retail market, since a generation ago live birds were generally available.

There is another obstacle the poultry industry must hurdle if it is to retain more than a residual demand for its meat. If the discriminating housewife wants assurance that the meat she purchases is wholesome, from healthy animals and slaughtered and processed under hygienic conditions, the packers are prepared to furnish that assurance in the government inspection label. If she wants official assurance that the poultry she buys was not sick when slaughtered or that it had not died of disease before being dressed, it is denied her. She probably already knows that the fewer inquiries she makes into sanitary conditions surrounding processing, the better for her peace of mind. Of course, there are good products on the market but in the absence of proof of wholesomeness — official inspection — all poultry must be classed with the doubtful.

A great potential market for poultry meat awaits the poultry industry—when it merits it. Only the old market will accept what it has offered heretofore.

Pigs and Brood Sow Costs

When it is recognized that it requires five pigs per litter or 10 pigs per sow per year to pay brood sow expenses, it's easy to see that the average producer is operating on a narrow margin. In many cases, just one extra pig per litter will double the profit at weaning time. Just a little more care in selecting the gilts and sows for breeders, just a little more consideration in feeding them, just a little more attention before and after farrowing, and an effective disease control program, will increase the income of all who are interested in pork production.—*Purina Nutr. News Bul.*

Refrigeration for Anaesthesia and Shock

For a generation heat has been the accepted treatment for shock. During World War I medical officers went to great lengths to keep severely injured soldiers warm as a preventive and treatment of shock and credited the treatment with the saving of a great many lives. About five years ago, the theory that patients suffering from shock should be kept in surroundings of a temperature of 100° F. or even higher began to be questioned and research conducted on rabbits showed the highest percentage of recoveries in an environmental temperature of 72° F. About this time it was discovered refrigeration of injured extremities gave surprisingly beneficial results in the prevention of shock and at the same time constituted the safest anesthetic for amputation involving such parts.

In a recent report, Crossman, Allen Fay, *et al. (J. Am. Med. Assn.*, 130:4, 195-189, 1945) cite more than 50 amputations under refrigeration anesthesia without shock in any case. In other amputation cases, inoperable because of the general condition of the patient, the injured limbs were held under refrigeration, just above freezing, one to three weeks without extension of the infection. These authors regard hypotonic saline solution as much superior to blood plasma for intravenous injection in shock therapy.

The United States Livestock Sanitary Association

THE 49th annual meeting of the U. S. Livestock Sanitary Association was held in Chicago, as have been all preceding meetings since 1908. The dates were Dec. 5-7, 1945. Dr. C. U. Duckworth of California was president. Various subjects pertaining to veterinary research or the control of animal diseases were discussed. The notes are from some of these discussions.

Anaplasmosis[1]

The insidious nature of anaplasmosis makes it one of the most difficult of diseases to control because, (1) recovered cases remain carriers for life, (2) wild deer are susceptible and are a source of infection of cattle, (3) the disease is insect borne and is transmitted to cattle by various biting flies and mosquitoes and by at least 19 species of ticks, nine of which are known to transmit the infection to the succeeding generation through their eggs.

To complicate matters still more, man has become an important circumferential vector of anaplasmosis by means of hypodermic needles, horn saws, castrating knives and other methods of transferring blood from infected to noninfected animals.

Prophylaxis consists in preventing inoculating susceptible cattle with the blood of infected animals. A combination of DDT and rotenone seems to accomplish this so far as biting flies and mosquitoes are concerned. Ticks however constitute the greater menace and no successful means of circumventing them are known.

When animals are caught and cast in the field the excitement incurred renders blood transfusion of doubtful advisability

Cattle owners must be educated to the hazard of conveying the infection from one animal to another by blackleg or other vaccination and such operations as castrating, dehorning and ear-tagging.

Precautionary measures against natural spread of the disease comprise (1) protection of acute cases from biting insects by spraying or otherwise or segregation of such cases distant from other cattle and (2) branding and marking carriers for slaughter.

Many drugs have been employed in the treatment of anaplasmosis but none have been found which are superior to sodium cacodylate and 5% dextrose solution. Penicillin has been tried to no avail whatever. Plasma from normal animals is of no value and from recovered cases (carriers) is contraindicated.

Some have reported what appear to be encouraging results, in acute cases, from the administration of sulfathiazole, neosalvarsan, and cobalt chloride; the latter drug being used because of its reputation for stimulating the production of red blood corpuscles.

Theoretically, blood transfusion should be beneficial in anaplasmosis but the excitement incurred in restraining the animal for the injection and the danger of adding to the infection by the use of blood of unrecognized carriers render this procedure of doubtful advisability as a routine treatment.

[1] From the report of advisory committee on anaplasmosis. Dr. W. H. Boynton, chairman, University of California, Berkeley.

Incidence of Mastitis[2]

Records were kept of the occurrence of mastitis in a self-contained Jersey herd of 120 cows, for a period of six years. The colostrum and fore milk was examined every 30 to 60 days. Altogether more than 20,000 examinations of milk were made.

The incidence of Streptococcus infection increased evenly from 14% in the first lactation to 58% in the fifth lactation. The milk was infected 2% of the time in the first lactation and 27% of the time in the fifth.

The incidence of Staphylococcus infection was 77% at all ages.

The cause for this differing behavior of the two infections is not fully understood. The increasing prevalence of Streptococcus infection with age may be explained in part by increasing teat patency, more frequent injury to the udder or teat and an increasing sensitization of the udder tissue as a result of previous infections.

The exposure to Staphylococcus infection is much greater than to Streptococcus. It is probable that some staphylococci are entering the udder all the time but it requires mass invasion to cause infection. Evidence is accumulating that Staphylococcus infection enters the udder through the teat meatus but this is not proved.

Teat injury is widely held to be a cause of

[2] From a discussion of the incidence of streptococcus and staphylococcus and bovine udder infections in relation to predisposing factors by Dr. James M. Murphy, New Jersey Agricultural Experiment Station, Sussex.

Streptococcus mastitis, but is not defensible as the sole or even the major factor. Streptococcus infection following obvious injury to the teat meatus is usually of other than the agalactiae species. Non-obvious injury may be important in the genesis of *Streptococcus agalactiae* infection.

No-Visible-Lesions Tuberculin Reactions[16]

From 1940 to 1944 there were 1300 no-visible-lesion reactors to the tuberculin test in New York yearly and 500 reactors yearly that revealed only skin lesions on post-mortem examination. It seems incontrovertible that a large percentage of such animals are not infected and the slaughter of them occasioned a large economic loss.

In an endeavor to find a tuberculin that would not cause a reaction in non-infected cases nearly 1000 animals were injected with Bureau tuberculin on one side and a very highly purified tuberculin on the other. There was no advantage in using the highly purified, expensive product.

By using a different technic much of the loss from the condemnation of non-infected no-visible-lesion reactors can be avoided. When reactors occur in a herd where the history and the pattern of reactions is such as to raise a doubt that the herd is infected, the animals may be held for 60 days and retested. Infected animals will always give a good reaction on the retest but only 42% of the skin lesion reactors will react a second time. No-visible-lesion cases seldom react on the retest.

Let-Down in Tuberculin Testing a Hazard[17]

The long interval between tuberculin tests that was tolerated during the war because of the shortage of veterinarians is fraught with danger and should be remedied. Substandard practices are no longer justified.

We must not forget that the bovine type of the tubercule bacillus is capable of producing every type of tuberculosis that occurs in man and is not confined to the tuberculosis of the bone as was formerly thought. In some countries 10% of the tuberculosis of persons is due to the bovine type of the organism. There is no reason to believe that the bovine type is less pathogenic for man than the human type of the organism.

Bovine tuberculosis is a public health problem and we cannot tolerate practices that condone its presence or which favor its survival.

[16] Discussion of a study of the results of retesting a group of tuberculin test reactors, by Dr. Alexander Zeissig, Cornell University, Ithaca, N. Y.

[17] From the report of the committee on tuberculosis. Dr. W. H. Feldman, Mayo Foundation, Rochester, Minn., chairman.

With no wish to undermine confidence in tuberculin one can entertain an honest doubt of its infallible specificity. It must be admitted that many animals react without other evidence of infection. The no-visible-lesion reactor is an annoying problem. More research is urged to determine if cattle can be sensitized naturally by organisms other than those of bovine tuberculosis.

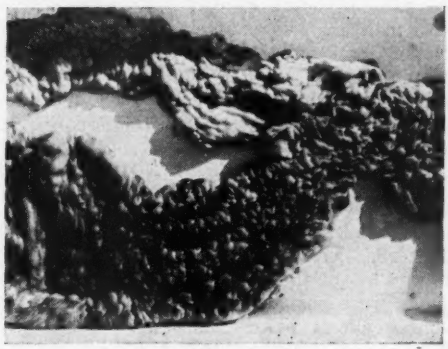
The avian tuberculosis organism is a potent complicating factor in the problem of no-visible-lesion reactor and should receive more study.

The Johne's Disease Problem[18]

The regional animal disease laboratory at Auburn was established in 1938. One of the problems undertaken at that time was the production of a johnin comparable in efficiency to tuberculin.

Johne's disease is a widespread infectious disease causing an annual loss of upwards of five million dollars. It is increasing in prevalence and, judging by the experience of other countries, it may become of major importance.

It is caused by an organism belonging to the



Lesions of Johne's disease in the ileum, cecum and colon of a cow

acid-fast group, which is viable for a long period outside the body of the living animal. It is a near relation of the avian tubercle bacillus which possesses the same characteristic of toughness.

Young animals are more susceptible to Johne's disease than adult animals.

The usual experience with this disease is for from 2 to 10% of the herd to develop clinical symptoms and die annually. But strains of the organisms differ in invasive capacity. Usually in an infected herd, a minority of the infected animals exhibit clinical disease, but in some

[18] From a discussion of the Johne's disease problem and the relation of Johne's disease to the non-visible-lesion tuberculin test reactor, by Dr. Howard W. Johnson, Regional Laboratory U. S. Bureau of Animal Industry, Auburn, Ala.

infected herds only an occasional animal will develop symptoms.

The Brucellosis Control Record in 1945[21]

This report contained no surprises for those who have watched the steady deterioration of the Federal-State Brucellosis Control Project. Shorn of the verbiage intended to conceal its failure, the report means the prevalence of bovine brucellosis increased during the year as did the percentage of reactors. Thus the trends in both respects, of the past several years was unbroken in 1945. The herds tested numbered 395,236; cattle tested 5,213,458; reactors 243,050; calves vaccinated 501,114. The percentage of reactors was 4.7, an increase of approximately 100% since 1941. A 100% increase in the incidence of a slow-spreading disease in four yeas is some kind of a record, but hardly one to point to with pride.

Eighty-five counties in ten states were removed from the modified accredited list. Nearly two-thirds of the reactors were slaughtered; more than one-third retained in the herds. New York accounted for nearly one-half the retained reactors and for one-fifth of the calves vaccinated under official supervision.

No mention was made of the new test developed by Doctor Huddleston by which infected animals can be separated from non-infected reactors to the agglutination test.

The vaccination of adult animals continues to give encouraging results.

Brucellosis Control in New York State[20]

Records kept over a period of six years of 25 herds, averaging 52 animals per herd, showed 3% of the calves four to eight months of age were positive to the agglutination test for brucellosis before they were vaccinated. These herds were all infected; the reactors varying from 15 to 47%.

Of calves vaccinated at six to eight months of age 60% were negative after six months and 80% one year after vaccination. At two years of age (eighteen months after vaccination) 96½% were negative and 99% were negative at the time of second calving. Those reacting positively to the test bred as well as the negative reactors. More than 9000 calves are vaccinated per month under official supervision.

Flexibility is indispensable to any successful plan of brucellosis control. By January, 1944, vaccination was recognized as the plan most widely applicable and since that date the herds under state supervision adhering to the test and slaughter plan has fallen from 2800 to 200.

There is no better time to start a vaccination plan than when the herd is free from brucellosis. No spread of the disease has occurred from persistent vaccination reactors to the agglutination test.

The vaccination of adult animals is recommended in heavily infected herds. It is economical and good herd practice.

Brucella Vaccination in Swine[22]

Herds aggregating 1181 swine were studied for a period of five years. In one herd of 86 hogs 49 reacted during one year. All reactors that were saved became negative.

Reacting sows became negative in an average of six months; boars in nine months.

Boars running with infected sows became reactors within two months.

The vaccination of pigs, 51 to 63 days of age with strain 19 was tried. Some developed a low blood titer, others showed no reaction. After breeding these gilts were challenged with virulent organisms—by feeding, by introduction into the conjunctival sac and by injection into the vagina.

Of the vaccinated gilts 11% aborted, but the pigs farrowed by the remainder were strong. Of the controls 44% aborted and 33% farrowed weak pigs. Only one gilt aborted infected fetuses.

Swine Erysipelas in Illinois[8]

Since 1920, occasional cases of swine erysipelas have been diagnosed at the diagnostic laboratory of the Illinois Department of Agriculture. Since 1941 the increase in the number of specimens received at the laboratory, which were diagnosed as swine erysipelas, has been very rapid. The disease is least prevalent in the winter but increases during the spring and summer reaching the peak for the year in October.

The order of frequency of infection in specimens is: kidneys 83%, spleen 75%, liver 66%, and joints 35%. Specimens of at least these four tissues should be sent to the laboratory when an examination for *Erysipelothrix rhusiopathiae* is desired. A history of the herd and of the farm and the symptoms exhibited by affected animals should be supplied with the specimens.

[21] From a discussion by Dr. A. E. Wight, in charge of Tuberculosis Eradication, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.

[20] From a discussion of data related to the extent of post vaccination reaction in calves and the New York plan of control of brucellosis, by Dr. Asa Winters, Assistant Director, Bureau of Animal Industry, Albany, N. Y.

[22] From a discussion of experimental work on *Brucella abortus* vaccination of swine, by Glenn C. Holm, Experiment Station Veterinarian, University of Idaho, Moscow.

[8] From a discussion of swine erysipelas, by Dr. C. C. Morrill, Associate Professor, Veterinary Pathology, University of Illinois, Urbana.

Typical symptoms are painful joints, bright clear eyes and temperatures up to 107° F. A humped back, head down, walking on the toes and slight enlargement of the joints are also common symptoms. Much enlarged joints, extensive skin slough and the classical, diamond-shaped skin lesion are less common. Cauliflower-like growths on the heart valves also occur in swine erysipelas.

No correlation has been observed between swine erysipelas and immunity to hog cholera.

It is very important in outbreaks that veterinary practitioners differentiate between swine erysipelas and hog cholera and do it promptly.

Pitch Poisoning in Swine[9]

Pitch poisoning is common in swine where the animals are allowed on grounds over which clay pigeons have been shot by gun clubs. It matters not how long it has been since the broken discs were scattered over the area. One instance of pitch poisoning was observed where it had been 35 years since the grounds had been abandoned by a gun club. Coal tar pitch used in sealing gas pipe lines also has been responsible for this type of poisoning in swine.

Poisoned animals may be found dead without any symptoms having been observed, but usually there is anorexia and sometimes icterus for a few hours before death.

The characteristic lesion of this ailment is a greatly enlarged, speckled liver.

Prevalence of Swine Diseases[10]

Because of the large increase in the number of hogs on farms in 1944 a sharp increase in loss from disease was expected. It didn't develop. Because of the continued emphasis placed on swine production in 1945 as a contribution to the war effort, an increase in the percentage of animals lost from disease during the past year was confidently predicted by many livestock sanitary officials and leaders in the swine industry. According to replies to a questionnaire sent by the committee to the livestock sanitary control officials in all the principal swine producing states, there was not only no increase in swine mortality due to communicable disease during 1945 but an actual decrease. This good fortune of the swine industry and the nation may have been due to the comparatively high price of hogs causing the swine raisers to give their animals better care and employing veterinary service earlier when disease invaded or threatened their herds.

Hog cholera is reported to have decreased in all but two states.

Swine erysipelas decreased in all except Illinois.

Tuberculosis increased in five states; decreased in the others.

The enteritides have been about static with a slight increase in some states and a slight decrease in an equal number. The same applies to parasites.

Porcine brucellosis increased this year as it did also in 1944 in all of the states of the cornbelt.

The loss of young pigs is still unnecessarily large.

Livestock Parasites Being Conquered by Research[9]

Results of accelerated research during the war enable livestock producers to combat animal parasites more effectively than ever before. Most of the new knowledge has led to more effective or more economical means of combating animal pests than methods used previously.

Cattle grubs may be controlled effectively by the use of rotenone-containing materials, incorporated in dusts, washes, sprays, and dips. Recent tests have shown that when used as a fine spray applied with power-operated orchard equipment, the rotenone preparation should be under a pressure of at least 400 pounds at the nozzle.

Cattle lice may be controlled by a rotenone-containing dip. When it is necessary to deal with both lice and warbles, one extra dipping 16 days after the first is needed.

Sheep ticks also succumb to rotenone dips which, in the light of recent research, may be weaker than was formerly recommended as the proper strength.

Common stomach worms and nodular worms of sheep can be controlled effectively by a mixture of phenothiazine and salt. Besides killing the worms, this medication prevents most of the larvae of worm eggs from developing. Thus the treatment is both curative and preventive.

Liver flukes in cattle have proved to be vulnerable to medication with hexachlorethane and bentonite, given together as a drench. To prepare the drench add one pound of hexachlorethane, 1.5 ounces of bentonite and 0.25 ounce of flour to 25 ounces of water. Of this

[9] From a discussion of pitch poisoning in swine, by Dr. R. Fenstermacher, Associate Professor, Division of Veterinary Medicine, University of Minnesota, St. Paul.

[10] From the report of the committee on transmissible diseases of swine. Dr. H. C. H. Kernkamp, chairman, Professor, Division of Veterinary Medicine, University of Minnesota, St. Paul.

[9] From a discussion of Wartime development in controlling parasites of livestock, by Dr. Benjamin Schwartz, Principal Zoologist in Charge, Zoological Division, Bureau of Animal Industry, Washington, D. C.

mixture the dose for cattle is 6.5 ounces and for calves three ounces.

Ascarids, which are the most common and injurious worm parasites affecting swine, can be removed effectively by treatment with sodium fluoride, 10 parts by weight in 90 parts of feed. Until quite recently, no especially efficient medication for these worms was known. Though poisonous, this chemical is not significantly toxic to pigs. Various other internal parasites of swine, in addition to ascarids, can be controlled fairly well, merely by liberal feeding of either fluid or powdered skim milk or whey.

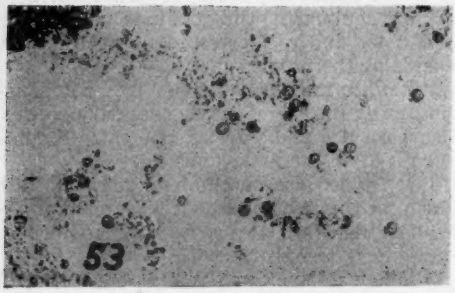
DDT and Other Parasiticides[7]

DDT is the most valuable parasiticide so far discovered. Dusting powders containing 4% of DDT are effective against biting flies, lice and fleas and, perhaps, against all mites. A 1% solution is equally efficacious. DDT is not effective for screw-worm flies, bot flies or other flies that visit the animal only momentarily to deposit eggs.

Sodium borate administered in the feed for four or five days, beginning up to four days after exposure appears to be of material value in coccidiosis in chickens.

Sulfaguanidine in Coccidiosis of Poultry[4]

In the treatment of coccidiosis in commercial flocks of chickens, 1% of sulfaguanidine



Oocysts of *Eimeria tenella* x 100

was given in the feed for five days. The death loss was 2.6%. In untreated (control) birds the mortality was 80%. The birds that recovered, both treated and untreated, were immune to later infection.

In a natural outbreak a 0.75% sulfaguanidine mash, fed intermittently for three-day periods at eight-day intervals, gave a high degree of protection and is probably the best way to use the drug in naturally occurring outbreaks, where the birds are in different stages of incubation and disease.

Newcastle Disease[5]

During the winter of 1944-1945 a number of outbreaks of a respiratory disease occurred among poultry flocks in the southern part of New Jersey. It was thought to be the usual seasonal outbreaks of coryza and little attention was paid to it. When young chicks hatched in the spring in the same flocks, developed the same disease it was suspected of being Newcastle disease (pneumoencephalitis). The diagnosis was confirmed by test against a known antiserum and later by inoculation of a 10 or 11-day embryo.

Many of the tissues of the infected bird may contain the virus. It is found most often in the spleen and the brain. It is easier to isolate the virus in the early stages of the disease than later.

During the spring and summer of 1945, Newcastle disease was recognized in seven of the 21 counties in New Jersey.

The symptoms of the disease are mainly respiratory. When it appears on a farm all chickens, turkeys, guinea hens, ducks, and geese on the premises should be slaughtered.

Efficiency Tests of Rabies Vaccine[13]

Doctor Johnson reported that the tests of rabies vaccine begun at the laboratory of the Rockefeller Institute a decade or more ago have been completed. Reports of progress in this research have been made at previous meetings of the association.

In the early experiments a small dose (5cc) of commercial vaccine was used. Dogs were significantly protected by a single dose of such vaccine, but a considerable percentage of the vaccinated animals were inadequately protected to withstand massive infection and contracted the disease. However, the results of the single injection are good enough to warrant the recommendation of it as a means of rabies control.

In later experiments larger doses of vaccine were used. In the latest experiments a 20cc dose of sheep brain vaccine was employed and a high degree of protection was afforded. Where three injections of vaccine at weekly intervals were given 100% of the animals survived the test inoculation.

[7] From the report of the committee on parasitic diseases. Dr. R. E. Rebrassier, chairman, College of Veterinary Medicine, Ohio State University, Columbus.

[4] From the discussion of the response of induced and natural *Eimeria tenella* infections to sulfaguanidine by Dr. K. C. Seeger, Assistant Professor, University of Delaware, Georgetown.

[5] From a discussion of Newcastle disease in New Jersey by Drs. F. R. Beaudette and J. J. Black, New Jersey Agricultural Experiment Station, New Brunswick.

[13] From a discussion of experimental field studies of canine rabies vaccination, by Dr. Harald N. Johnson, Director, Rabies Laboratory, Rockefeller Foundation, Montgomery, Ala.

The public will accept a short period of quarantine but not a long one.

A large number of dogs have been used in Doctor Johnson's research and at the same time a state-wide compulsory vaccination law in Alabama since 1937 has afforded an extraordinary opportunity to observe the effect of the use of vaccine in the field. The law has been enforced continuously in some counties and disregarded throughout its existence in other counties. Still other counties have enforced it some years and not enforced it other years.

The experience in Alabama conclusively demonstrates that rabies cannot maintain itself in a section where 60% or more of the dogs are immune. The chain of infection is broken too often where only 40% of the animals are susceptible.

Some counties, when outbreaks of rabies have occurred, have enforced vaccination and quarantine; others have relied upon vaccination alone. The results have been the same under both methods of control—eradication of the disease promptly where 60 to 75% of the dogs are properly vaccinated.

Control of Rabies in Maryland[15]

At a preceding meeting (1944) the author reported that Maryland had been nearly free of rabies from 1931 to 1942. During four years of that 12-year period, there was no rabies in the state. During eight years of the period the number of cases varied from one to eight. The latter number occurring in 1936 and including seven dogs and one horse. During this time a quarantine by the state department of agriculture was placed upon the district immediately upon the appearance of a case of rabies. The procedure was efficacious.

Early in 1943 cases of rabies appeared in Montgomery and Prince George's counties and the usual quarantines were instituted. Although local authorities coöperated well in enforcement of the quarantines, cases continued to occur and by the end of the year there had been 52 cases in Montgomery County and 50 cases in Prince George's County.

The prevalence of the disease continued to increase in 1944 in Montgomery and Prince George's counties and spread to eight other counties in the state. By the end of May 74 cases had been found in Montgomery county and a program of vaccination was started.

In Montgomery County 11,500 dogs were vaccinated. This constituted about 90% of the dogs in the county since a large number of strays had been collected during the quarantine. During the succeeding four months five cases of rabies occurred. Two cases were in dogs—unvaccinated strays. Two were in cats and the fifth one occurred in a cow.

In Prince George's County 11,500 dogs were vaccinated. This was about 75% of the dogs in the county, there being many ownerless and stray dogs still at large in this county. In the following four months 15 cases of rabies occurred—14 dogs and one cat. Ten of the dogs were strays and four had been vaccinated. Of these four, one developed the disease five days after vaccination, another three weeks afterward and a third had been severely bitten five days before it was vaccinated. Naturally, one concludes that these dogs were infected

Stray dogs constitute a rabies infection pool

before they were vaccinated. The fourth vaccinated dog that developed rabies was one of two belonging to the same woman. Its mate died of rabies July 18 and this dog was vaccinated Aug. 1. It developed rabies in October. It is quite possible that this dog, too, was infected prior to vaccination. A total of 239 cases of rabies occurred in the state in 1944.

The vaccination program was continued in 1945 with the result that the number of cases in the state fell to 63. Approximately half of them occurring in Prince George's County, which borders the district of Columbia where rabies was prevalent throughout the year. Again it was a problem of strays, probably in part from the District of Columbia.

Montgomery County, which coöperated well in the vaccination program, had but one case in 1945, in contrast to 74 cases in the first five months of 1944, before vaccination was started.

In the city of Baltimore where, of course, the problem of eliminating strays is, as in any

[15] From a discussion of rabies control programs in Maryland by Dr. A. L. Brueckner, Director, Livestock Sanitary Service, College Park, Md.

large city, a difficult one, there were 12 cases of rabies in 1945.

Of the 63 animals that died of rabies during the year, two had been vaccinated.

This Maryland experience indicated that outbreaks of rabies can be handled successfully by vaccination and elimination of strays.

Prevalence of Rabies[14]

The cases of rabies reported to the Federal Bureau of Animal Industry during the past year numbered 10,540—a larger number than in any previous year. Four states reported nearly 1000 cases each—Louisiana 996, Texas 950, California 914 and Pennsylvania 904. Georgia reported 619 and Tennessee 605 cases of rabies.

In contrast, a large area in the West reported few cases. North Dakota, South Dakota, Montana, Wyoming and Nevada reported no cases; Washington, Oregon, Idaho, Nebraska and Colorado reported one each, and Minnesota reported two cases.

More than 9,000 of the rabies victims were dogs. Human cases numbered 53; cattle, 561; and cats, 419. The remainder were various domestic and wild animals.

There was large scale vaccination of dogs during the year and the results were highly gratifying. In outbreaks where vaccination and quarantine were employed the disease was suppressed in a short time. In outbreaks where sole reliance was placed in measures other than vaccination, eradication was a long drawn-out process.

The present day rabies vaccine is much improved over that of former years. The Habel Mouse test, which is now required of all vaccine, assures a dependable product.

Veterinary Experiences in Italy[12]

In Italy there are 4000 graduates of 10 veterinary schools and fewer than 20 million animals, exclusive of poultry. Very few veterinarians are engaged solely in private practice; nearly all being in the public service—a majority on part time basis but one or more in each province are employed full time by the government.

As Italian territory was occupied by the American Army, army veterinarians were placed in charge of the civilian veterinary service. As Italian veterinary laboratories were dismantled by the retreating Germans it was necessary for the army to supply biological products for the Italian veterinary service until the laboratories could be reëstablished and $60,000 worth of such products were supplied. This enabled the veterinary service to control various outbreaks of disease, including hog cholera, and conserve a large amount of food that was greatly needed by the civilian population.

The greatest obstacle encountered in disease control was the difficulty of travel and communication. No motor transport was available and but few horses. Italian veterinarians usually had to travel in pony carts or on foot. There was practically no telephone or telegraph service and mail service was slow and uncertain. Inflation was rampant. Beef cost $5.00 a pound and pork $4.00. Drugs were scarce and expensive.

The principal diseases with which the veterinary service had to contend were: equine epizootic lymphangitis, glanders, dourine, foot-and-mouth disease, tuberculosis, anthrax, piroplasmosis, brucellosis, trichomoniasis, swine erysipelas, hog cholera, swine pox, rabies and Newcastle disease.

Foot-and-mouth disease first appeared in the occupied zone in May and spread rapidly over 16,000 square miles. The Waldmann vaccine was employed when available. Had a sufficient quantity been available it might have stopped the outbreak. The mortality of all cattle in the area was 2%. In infected dairy cattle the mortality was 7% and in calves 25%. Attacks of the disease in pregnant animals commonly caused abortion.

Anthrax which had caused much loss in Italy was controlled by vaccination.

Of 1000 cows examined, 800 had trichomoniasis. The spread of this disease was prevented by employing artificial insemination very extensively.

Brucellosis, melitensis type, was common in sheep and goats. Brucellin was used as a diagnostic agent with success. No attempt was made to control brucellosis in cattle.

There is a great amount of bovine tuberculosis in Italy; 50 to 80% of the dairy cattle being infected. No attempt was made to eradicate it. Improvement in the tuberculosis situation in Italy is hopeless at the present time.

There is no practical preventive for piroplasmosis in Italy under present conditions. Acapin is useful in treatment of the disease but was almost unavailable during the occupation.

Swine erysipelas was prevalent. The simultaneous serum-culture vaccination was used on 250,000 animals with excellent results. In hog cholera outbreaks, serum and virus were used in infected and exposed herds and crystal violet vaccine in unexposed herds. The

[14] From a report of the committee on rabies. Harry W. Schoening, chairman, Head Veterinarian in Charge, Pathological Division, Bureau of Animal Industry, Washington, D. C.

[12] From a discussion of communicable animal disease problems in Italy, by Lt. Col. R. W. Rushmore, V.C., A.U.S.

results with both types of vaccination were entirely satisfactory.

There was much glanders among the horses and burros of the civilian population, but little mallein was used because the difficulties of travel and, owing to the inflation, its high cost made it impossible to do much testing.

Equine epizootic lymphangitis was common. Affected animals were not slaughtered. Some were treated but in most cases the results were not very satisfactory.

There was much equine infectious anemia in northern Italy but nothing was done about it.

Newcastle disease was common in chickens. The mortality ranged from 10 to 50%; the most characteristic lesions being laryngotracheitis and hemorrhagic enteritis. Five million doses of vaccine were used. It afforded good protection but unfortunately it lasted only about six weeks. Geese, ducks and turkeys were not naturally infected.

Rabies had been rare in Italy before the war, according to official reports, but after the break down of the veterinary service, following the defeats of the Italian armies in Greece, Albania and Africa and occupation of the country by the Germans, rabies increased steadily and was very prevalent in 1943 and 1944. In the latter year 57 persons are known to have died of this disease. It was with difficulty brought under control since vaccine was not available and the leash, muzzle and quarantine had to be relied upon.

Dourine was introduced in 1945 by captured animals. Seventeen infected stallions were discovered and eliminated but owing to the difficulty of travel, inflation and lack of laboratory facilities little else was done.

The Public Health Veterinarian[11]

The importance of any profession is evaluated by its contributions to society's advancement. On this score the veterinary profession has long been one of the leaders in the betterment of mankind. No successful animal industry has developed in countries lacking a competent veterinary service. Public authorities agree that it is not possible to build a successful health program in countries lacking an animal industry adequate to provide the necessary proteins and minerals for the human diet.

The veterinary profession has made large contributions to public health in this country in the past, but its status in the public health service has not improved in proportion to the tremendous growth of public health activities during the past 10 years. There are approximately 400 veterinarians in public health positions now which is about the same number that were so engaged in 1935, notwithstanding the over-all public health personnel has increased greatly in the past decade. Through the efforts of educational leaders and the Army Veterinary Corps, the United States Public Health Service has become aware of the vast field of veterinary public health which is without national representation or, in most instances, state guidance.

One field in which veterinary medicine has demonstrated public health value is in the suppression of animal diseases communicable to man. When glanders, anthrax and bovine tuberculosis were prevalent among animals in this country they were important public health problems. When veterinarians suppressed them in animals these diseases became insignificant to public health. However, they are still important to the public health in countries in all parts of the world where veterinarians have not brought them under control in animals. Much remains to be done in this field. The list of diseases and parasitisms communicable from animals to man is a long one. One need mention only brucellosis, rabies, salmonellosis, tuberculosis and encephalomyelitis to emphasize this.

The purpose of this discussion is to point out the great need for public health veterinarians in a balanced public health program. To serve efficiently in public health the veterinarian must know the objectives of the health officer, the health nurse, the health educator, the sanitary engineer and all other public health workers and they in turn must understand his objectives in order to coöperate effectively.

The veterinary profession, like the public health service, is founded largely on preventive medicine and its greatest achievement have been in that field. Disease control is stressed throughout veterinary education and ideally equips the veterinarian professionally to meet public obligations. Leaders in public health activities understand the part the veterinarian can play in our over-all health program.

Like the graduate in medicine, in engineering, in nursing, and in other professional services, the veterinary graduate needs further training before taking up public health work. Such training may be taken at graduate schools of public health or through in-service training. The United States Public Health Service has established an in-service training center at Atlanta, Ga., which provides a three-month training period for public health employees, including veterinarians.

[11] From a discussion of the public health veterinarian, by Dr. James H. Steele, Sanitarian, States' Relation Division, United States Public Health Service, Washington, D. C.

Community Sales[2]

Sales barns have been a means of sale of animals for many years. For a long time only horses and mules were handled, but when the automobile, motor truck and tractor largely put these animals off the market; the sale of other farm animals was taken up and the number of places where sales are held increased enormously. A greater number of animals are now sold at community sales than anywhere else.

The problem is a complex one and exceedingly difficult to control. With all their faults these sales serve a useful purpose and powerful interests oppose restrictive measures.

Most of these institutions break all the livestock sanitary laws and regulations of the state at every auction. Animals are trucked sometimes hundreds of miles to these sales and cross state lines without inspection and in defiance of regulations for the control of disease. The difficulty of enforcing regulations for the interstate movement of livestock when transported by truck is illustrated by Illinois. There are 76 bridges and ferries across that part of the state's boundries formed by rivers, to say nothing of the highways and byways that enter the state from Wisconsin and Indiana. The authorities do not have a force, and have no prospect of getting a force, adequate to police all these points of possible entrance 24 hours a day.

The following suggestions were offered as a means of preventing some of the disease dissemination for which community sales are now responsible.

1. Require the owners of community sales to post a bond not only for the payment of animals but for compliance with the state laws and regulations.

2. Have a veterinary inspector on duty at each sale. He should be authorized to prevent the sale of any animal regarded as diseased and any that have crossed the state line without a proper health certificate. He should have authority also to quarantine diseased animals.

3. Make it a crime punishable by fine or imprisonment for anyone, knowingly, to deliver a diseased animal to a sale.

4. Require proper shelter for the animals and necessary facilities for inspection of the animals before they are offered for sale. Quarantine yards should be provided at sales.

5. Require the separation of animals destined for slaughter from those sold for feeders.

6. Require that all trucks shall be cleaned and disinfected before loading animals at a sale.

7. Require the name and address of every consignor of animals at a sale and a description of the animals.

8. Require the sale management to keep on file for two years the name and address of every buyer at a sale, a record of the animals purchased and the price paid. These records, of course, to be open for inspection.

9. Provide for cleaning the premises at regular intervals and at such other times as the veterinary inspector deems necessary for safeguarding the health of the animals.

[2] From the report of special committee on community auction sales, by Dr. C. E. Fidler, chairman, Chief Veterinarian, Illinois Department of Agriculture, Springfield.

Diagnostic Laboratories and Vital Statistics[19]

Two recommendations were made by the committee:

1. The establishment of Bureau of Animal Industry diagnostic laboratories in various parts of the United States. These laboratories to collect and publish veterinary vital statistics in addition to supplying a diagnostic service for B.A.I. field employees and veterinary practitioners, and become a division of the vital statistics bureau of the census.

2. That the U. S. Livestock Sanitary Association establish a committee on vital statistics.

Enteric Diseases in Swine

Differential diagnosis of the enteric diseases of swine is next to impossible; treatment more or less empiric and the outcome often unpredictable.

DDT Effective Against Swine Lice

A single application of DDT proved effective in ridding swine of heavy infestations of lice in experiments conducted under farm conditions by veterinarians of the U. S. Department of Agriculture. The tests are regarded as preliminary as there were no controls.

Some of the pigs were sprayed; others were dipped. For both methods of application, the DDT was prepared in emulsions of mineral oil and water. Sprays containing 0.1% and 0.5% of DDT, each tested on eight animals, destroyed all lice within four hours but failed to kill the nits or all the young lice that hatched later. However, only a few lice were found eight weeks after the treatment on the pigs sprayed with the 0.5% solution.

Dipping 300 heavily infested pigs in a solution containing 0.75% of DDT killed all lice within four hours. The DDT remaining on the hair and skin of the dipped animals also continued to kill the young lice as they hatched. Consequently the dipping treatment entirely eradicated the parasites from the herd.

[19] From the report of the committee on miscellaneous diseases. Dr. Charles R. Schroeder, chairman, Pearl River, N. Y.

Additional Veterinary Officers Separated rom the Service Since VE-Day

Alabama

itzgerald, Theodore C.
reen, James Ethridge
amner, Eugene P.
Kendall, Hunter E.
Marston, Edward D.
Wann, Russell S.
Wendell, Carl E.

Arizona

ssen, Keith Obed
McQuown, Paul F.

Arkansas

rooks, Willard C.
ey, William E.
Labahn, Charles D.
Omohundro, Richard E.

California

owers, Frederick U.
urriss, William M.
arroll, Howard F., Jr.
eLay, Paul Daniel
win, C. E.
vans, Milton R.
arrett, Thomas W.
eorge, Eugene W.
idley, Joseph Lehn
ell, Preston L.
Harrison, Earl H.
Harrison, Joseph W.
Henig, Harold Frank
Ketchersid, James R.
Lacey, Lee Thomas
McDonald, Ian C.
Padfield, E. T.
Thom, Myron A.
Twisselmann, N. M.
Whitehead, Charles J.

Colorado

ggs, William E.
hlender, Isaac N.
rown, Homer B.
wen, Russell L.
avis, Charles Louis
ead, Leland E.
Hester, Kenneth J.
Johnson, Harry W.
Leadbeatter, Wayne A.
Smith, John William
Stewart, Russel J.
Watson, George R.

Connecticut

ckburn, Kenneth A.
assman, Albert N.
McIntosh, John P.
Pieper, Niels W.
Winn, John Douglas

Washington, D. C.

cke, Robert F.
Miller, Howell D.
Ruebush, Ephraim E.

Florida

lthaser, B. F., Jr.
e, Clarence E.
Mathews, Elmer L.
McCreary, Andrew J.

Georgia

ley, Eldred W.
ood, Bernard F.
Murphy, James T.
Wesley, Joseph L.

Idaho

erchant, Willard R.
Nichols, Wilbert C.

Illinois

ements, J. H.
awford, James P.
rog, Robert John
enzy, Sam George
agness, Theodore A.
ingstone, John M.
cCannon, W. B.
McGinnis, Clifford L.
Ott, Herbert I.
Poppenhouse, G. C.
Prendergast, Walter B.
Tamoglia, Thomas W.
Watson, Ralph C.
Whiteman, Charles E.

Indiana

len, Bertram V.
rman, Harry A.
skins, Robert J.
Moore, Morris E.
Wann, Raymond W.
Welbourn, William E.

Iowa

ackburn, Loren C.
rey, John Wm.
eaver, John Wilbur
kin, Carrol Edwin
ldman, Louis W.
rmanio, Peter J.
bbs, Leonard W.
Preusser, Karl R.
Robinson, Charles E.
Savage, Robert E.
Smith, Philip E.
Sours, Calvin Dean
Sparks, Quinton W.
Theophilus, Donald K.
Holen, Borg Douglas
Leonard, Geo. A.
Lightbody, Hugh M.
Loucks, Joseph L.
Monlux, William S.
Morgan, Richard B.
Niffenegger, Dean L.
Thiele, Mervin I.
Thomson, Vale Ulan
Timms, Walter H.
Todd, Guy H.
Venzke, Walter G.
Wardall, Murray N.
Ziimdahl, Robert O.

Kansas

Bender, Henry A.
Caspar, Francis A.
Coddington, Alton M.
Collins, Wayne D.
Farris, Merle LeRoy
Gory, Peter Earl
Haley, John S.
Jordan, Frank W.
Kanawyer, Wendell L.
Kimball, Kenneth
Leasure, Thomas J.
Nelson, Walbert O.
Poppenhouse, Curtis A.
Prather, Elwin R.
Remsberg, Glen S.
Smith, William Daniel
Spong, Laurence E.
Storz, Fred
Watson, James H.

Kentucky

Gilmore, Don F.
Glass, Sherman A.
Nolan, Alfred F.
Taylor, Edgar Lewis
Treat, Lester Albert

Louisiana

Franks, Robert D.
Hesse, Charles P.
Hughes, Lynn Burk
Ward, Benj. F.

Maryland

Chadwick, Vernon D.
Conroy, James G.
Knudson, Robert L.
McClure, John F.
Tolley, Robert

Massachusetts

Cameron, Bertram N.
Carlin, Max H.
Groves, Lawrence W.
Mason, Marcus M.
Morkis, Edward S.
Schofield, Richard C.
Young, John R.

Michigan

Caswell, Don L.
Davidson, J. L.
Dawe, Louis T.
Green, Arthur L.
Henshaw, Milo J.
Howe, Nelson S., Jr.
Jones, Leon V.
Klooster, Melvin J.
Loomis, Ladd N.
Smith, Claude A.
Stoner, Norman H.

Minnesota

Dovre, Odin
Eder, Everett P.
Evans, David E.
Hughes, Leland S.
Klaus, Kenneth W.
McCausland, E. J.
Moen, Leonard A.
Mouw, John E. B.
Pint, Lawrence H.
Spangler, Don H.

Mississippi

Moses, Clyde R.
Randle, John Allen

Missouri

Berger, Joseph H.
Druley, Vincent T.
Farney, Joseph A.
Glover, Albert D.
Lash, Cleo L.
Sarasohn, Jay J.

Nebraska

Brillhart, Carl E.
Cady, Duane LeRoy
Gates, Morse A.
Gould, Kenneth Max
Jenkins, Oliver Lee
Johnson, Sanford E.
Kester, Howard L.
Miller, Clement L.
Murphy, Edward A.
Peck, Eugene Way
Reppert, Ray Fred
Schneider, Morris D.
Steele, Merrill L.
Worthman, Robt. P.

New Hampshire

Durant, Leslie
Goldsmith, Charles A.

New Jersey

Baumgarten, A. M.
Coane, Milton D.
Croshaw, Ryland
Lohmeyer, Carl
Lustig, Seymour
McPeek, Raymond C.
Relken, Walter E.
Tierney, William F.

New Mexico

Schroer, John Wm.
Smith, E. J.

New York

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Angstrom, Clement I.
Ayres, John P.
Chazley, Edward P.
Glass, H. M.
Ehrlich, David
Erdheim, Morris
Foster, Edwin N.
Herman, Samuel E.
Hickey, Thomas E.
Hughes, Donald V.
Kelsey, Richard C.
Miller, John Wilson
Nathanson, Sidney
Papish, Philip G.
Skerritt, W. H.
Stanton, Louis E.
Umans, E. M.
Wilder, Clifford W.
Wood, Donald A.
Young, George A., Jr.

North Carolina

Gregg, Merwin J.
Mauney, Jacob P.
Rogers, Arthur B.
Schooley, Maurice A.

North Dakota

Matter, Anthony J.

Ohio

Abraham, Max Carl
Alvanos, Costas S.
Badger, Max G.
Barner, Ralph D.
Boydston, James L.
Brandehoff, A. J.
Brandon, Glen C.
Court, Maurice
Durigg, John R.
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Elsasser, David S.
Fox, Charles W.
Friderici, W. J.
Gross, Irwin
Henson, Ben S.
Herd, Dwight G.
Holmes, John M.
Hook, Crosby J.
Ishee, Vaughn E.
Jones, Lowell M.
Kantzer, John F.
Muntz, Karl H.
O'Neill, John L.
Pavey, William H.
Price, Lawrence W.
Putnam, John Lyle
Sims, Jacob Barr
Smith, Kenneth Wm.
Smith, Robert M.
Sollomi, Phillip A.
Sprunger, Earl M.
Terrill, Lloyd H.
Tuttle, Martin L.
Wickham, John J.

Oklahoma

Bennett, Clarence K.
Bergsten, Marcus L.
Cook, Victor J.
Hemphill, John G., Jr.
Hodgson, Melvin E.
Vierling, Clarence C.

Oregon

Coons, Max Charles
Erickson, Kenneth
Harris, Earl M.
Heller, Oliver P.
Howarth, Carl R.
Ledgerwood, M. L.
McMichael, W. W.
Stevens, Blair A.
Storey, Ensly R.

Pennsylvania

Abell, Leonard J.
Buckley, Howard P.
Carlson, Vance A.
Emas, Jack Robert
Frank, Harry
Haverstick, Donald
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Krawitz, Leonard
Kriesel, Henry K.
McKee, Graydon S.
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Rochfort, Robert F.
Rovner, Bernard B.
Sacks, Sander A.
Sullivan, Francis C.
Swarts, Abraham L.
Tubis, Philip S.

South Carolina

Brown, Thomas E.
Young, Leonard E.

South Dakota

Swick, Calvin A.

Tennessee

Alford, Simon W.
Gathmann, R. A.
Hill, Howard E.
Sadow, Irving Jay
Young, Tyler J.

Texas

Anderson, R. J., Jr.
Barrett, Clinton D.
Bate, Louis B.
Burrus, Marvin M.
Demke, D. D.
Faust, Herbert R.
Fisherman, Henry
Greenlee, Homer H.
Harrison, J. W.
Hartman, Robert H.
Jackson, Lewis L.
Leonard, Harry O.
Levy, Abe
Martin, George
Miller, Arthur A.
Mills, H. B.
Payne, H. H.
Ramsey, Edward Wm
Redman, H. E.
Rogers, Willie T.
Scruggs, J. M.
Sparkman, C. M.
Walker, Asa L.
Ward, Drue Simpson
Zahn, Charles W.

Utah

Flint, Jean Carroll
Gold, Russel Willis
Mencimer, Floyd R.

Virginia

Eggert, Matthew J.
Eggert, Wm. E., Jr.
Kress, Joseph David
Thompson, Edward E
Williams, Walter J.

Washington

Arron, Daniel Pierce
Bloomquist, Ernest W.
Christopher, Burton C.
Conner, Roy Earl
Eshelman, Claude A.
Halverson, Orville J.
Kraft, James
Manly, Philip C.
Marlowe, Hilding M.
Newman, Leonard L.
Peterson, Harold O.
Whittrock, J. E.
Winston, James C.

West Virginia

Bailey, Lucien P.
Fallon, Harry Jack

Wisconsin

Abbott, John Elden
Burch, Clark Wayne
Collins, Charles G.
Harries, Chester E.
Hendricks, Stanley L.
Nelson, Marvin L.
Schubert, Carl John
Schwiesow, C. W.
Stauch, Donald M.

* * * *

Navy doctors who have made a study wood alcohol poisoning believe the essenti principle of treatment is the correction acidosis with an alkali such as sodium bica bonate. Of 31 patients so treated five di within three hours after admission to the ho pital. The remainder recovered.

* * * *

Evolution of the Horse

According to recent research by the Chica Museum of Natural History, the horse did n as has been thought, originate in Nor America. Its progenitor the eohippus (daw horse) a three-toed animal of about the si of a large cat originated in North Ameri some 55 million years ago and evolution pr gressed here until well into the Pliocene p riod. The ancestral horse then migrated b way of Alaska and Siberia which were the connected and were warm, to central As where the *Equus* or true horse was develope From there it spread to all parts of the wor except Australia. During most of the Pliest cene period it lived in the Western hemi phere but became extinct before the comi of the white man.

Penicillin Treatment of Acute Equine Infectious Anemia

By L. O. MOTT, C. D. STEIN, and J. O. HEISHMAN*
Beltsville, Maryland

NUMEROUS chemical agents tested in the treatment of infectious anemia (swamp fever) have been found to have no specific curative value up to the present time. The results obtained with some of the agents more recently tested by the Bureau have been reported elsewhere.[1,2]

The favorable results obtained with penicillin by Heilman and Herrell in treating mice artificially infected with the virus of ornithosis[3] and the virus of psittacosis[4], and the release by the War Production Board of penicillin in sufficient quantities for the treatment of large animals together with urgent need for a specific remedy for infectious anemia, prompted the authors to test the effect of relatively large quantites of this drug in treating an acute case of swamp fever. The opportunity was also afforded to obtain information regarding the blood level of penicillin and the rate of elimination in the horse following intramuscular injection.

Materials and Methods

The infectious anemia virus used was of an unusually virulent Wyoming strain that had produced death in 20 of 22 horses previously exposed and reported on elsewhere[5]. The exposure sample consisted of a 32-month-old 5cc vial of whole blood drawn from reacting horse 1295, lyophilized on 7-29-42, and stored at room temperature. Other samples from this lot of virus were tested immediately after lyophilization and after 16 months' storage, each of which resulted in an acute case followed by death.

The experiment was conducted within a screened pen with concrete floors, to which the normal susceptible horse was moved on the day it was exposed to infectious anemia virus.

Temperatures were taken twice daily throughout the incubation period after which time they were taken three times daily except during the course of pencillin treatment, when the temperatures were recorded every half-hour each day from 7:30 a.m. to 5:00 p.m. and no less frequently than every four hours from 5:00 p.m. to 7:30 a.m.

The hematological studies included the checking of the red cell volume, the red cell sedimentation rate, rapidity of clotting and serum separation. Whole blood samples with and without potassium oxalate anticoagulant for use in these studies were drawn from the animal, before his exposure to swamp fever and three or four times a week thereafter throughout the course of the disease. During the period of penicillin treatment additional blood samples for serum were collected for blood level penicillin assay.

The red cell volumes were checked to determine the course and progress of anemia according to Cesari's technic.[6]

The sedimentation rate of the red blood cells of acute or chronic infectious anemia cases is usually more rapid than in normal horses (Fig. 1) and is one of the tests employed in making a tentative diagnosis of swamp fever.[7]

Case History

A normal 2-year-old stallion (No. 1379), raised at the Animal Disease Station, Beltsville, Md., in good condition, and weighing approximately 900 pounds was used as the test animal. This horse was infected April 4, 1945. The 32-month-old lyophilized 5cc sample of virus, after subcutaneous injection into horse 1379, resulted in a 20-day incubation period, followed by two temperature reactions of 11 days and six days respectively; a third temperature reaction was in progress when penicillin treatment was commenced. This animal showed the usual clinical symptoms accompanying acute swamp fever—rapid loss of weight, general depression, congestion of the mucous membranes, frequent urination, alternate flexing of the joints of the hind legs, intermittent temperature reactions, a progressive anemia, some slowing of the clotting time of whole blood, and a rapid sedimentation rate. The rate of sedimentation of the red cells (Fig. 2) in this case is of particular interest because it is representative of a number of cases studied in which the animals when normal had a rapid sedimentation rate with a speed index of 80% or above. These animals when coming down with the disease after exposure, instead of showing the expected increase in sedimentation rate, would more often show a marked decrease for a few days. Similar observations have been made in experimentally infected horses by Lemétayer.[8] It is unknown whether this horse had a normal rapid

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sedimentation rate as only one pre-injection sample was taken and that showed a slow sedimentation rate with a speed index of 32.4. However, two days after exposure the speed index was up to 90.9 and continued high for 12 days or until six days before the first temperature reaction, when it gradually dropped to 43.0. When the temperature began to increase, the speed index ascended to a new high of 93.9 and remained high throughout the course of the disease. In addition to the condition mentioned, there was a gradual increase

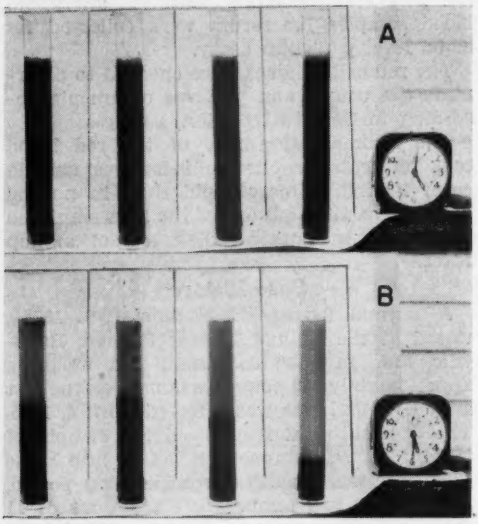

Fig. 1. A comparison of the red cell sedimentation rate of a blood sample from horse 1379, an acute case, with blood samples from a normal horse, a carrier, and a chronic case

A. The oxalate blood samples immediately after collection

B. The same samples after standing for thirty minutes

of chicken fat clot in whole blood samples accompanied by decreasing amounts of serum that separated from the clot. The clot began to increase with the animal's initial rise in temperature and continued increasing daily while the temperature receded with decreasing yields of serum for seven days, at the end of which time practically no serum could be obtained even after centrifuging the blood. At this point the amount of clot began to decrease gradually and the serum increased for another seven days during which time the second temperature reaction started and reached its peak. The same process was repeated with the subsequent temperature reactions. The greatest amount of clot and the smallest serum yield appeared each time between the temperature reactions. Other investigators have observed the occurrence of chicken fat clots in blood from acute swamp fever cases[9] and encountered difficulty in serum separation from the clots.[10] However, its occurrence had not been associated with the temperature curves. It is unknown with what frequency it occurs in most cases of acute swamp fever and whether there are any other infectious diseases of the horse with high temperatures that disturb the serum separation.

Penicillin Treatment

The treatment of infected horse 1379 with penicillin was started May 17, 1945, during the third temperature reaction 43 days after exposure and 23 days after the animal showed evidence of being infected. At this time the authors had decided that this acute case would be fatal unless some beneficial treatment was administered.

Six million units of penicillin were available for treatment, three million units of which consisted of sodium salt and three million units consisted of calcium salt. The drug was administered by intramuscular injection, the sodium salt being used first followed by the calcium salt. The dried penicillin was diluted with sterile physiological saline in the ratio of 100,000 units to 5cc of saline. The six million units of penicillin were administered over a period of 40 hours, starting with one million units to bring the blood level up rapidly. Four hours after the initial treatment the rate of administration was 500,000 units within every four hours. The first 500,000 units were equally divided between the 4th hour and the 6th hour, and the second 500,000 units were given at the 8th hour followed by 500,000 units at 4-hour intervals thereafter.

Assays for the drug were made on the blood and urine from the horse before treatment, during the course of the drug's administra-

Horse 1379. Acute case of induced infectious anemia 10 days subsequent to treatment with six million units of penicillin and four days before death

tion, and for several hours after treatment was completed in an effort to determine the blood level maintained with the dosage given and to find the rate of elimination of the drug through the urine.

Method of Assay

The samples of blood and urine obtained for penicillin assay were placed in a refrigerator at 6° C. within 30 minutes after they were collected. The clotted blood was centrifuged to obtain cell-free serum, following which both the serum and urine were passed through Seitz filters. All samples were assayed within 24 hours following collection. With two exceptions, the procedure described by Randall, Price, and Welch[11] for the estimation of penicillin in body fluids was followed in this study. In making the serial dilutions, plain bouillon was used instead of the broth recommended for this purpose and the tests were read at the end of 40 hours' incubation instead of after over-night incubation.

The test organism, a strain of *Bacillus subtilis* obtained from the Food and Drug Administration, Washington, D. C., grew well in all dilutions of the sample of urine obtained before the first dose of penicillin was administered. The test organism did not give typical growth with pellicle formation in the first two dilutions of serum from blood obtained prior to treatment. As a result of this observation, the first two dilutions of each sample of serum were subcultured on blood agar at the time the tests were read to determine whether viable organisms were present.

The test as employed in this study would not detect concentrations of penicillin lower than 0.125 unit instead of 0.03 unit per cubic centimeter as stated by Randall, Price, and Welch. It is quite possible that this variation in the sensitivity of the test was influenced by the use of a different medium in making the serial dilutions and by the longer incubation period.

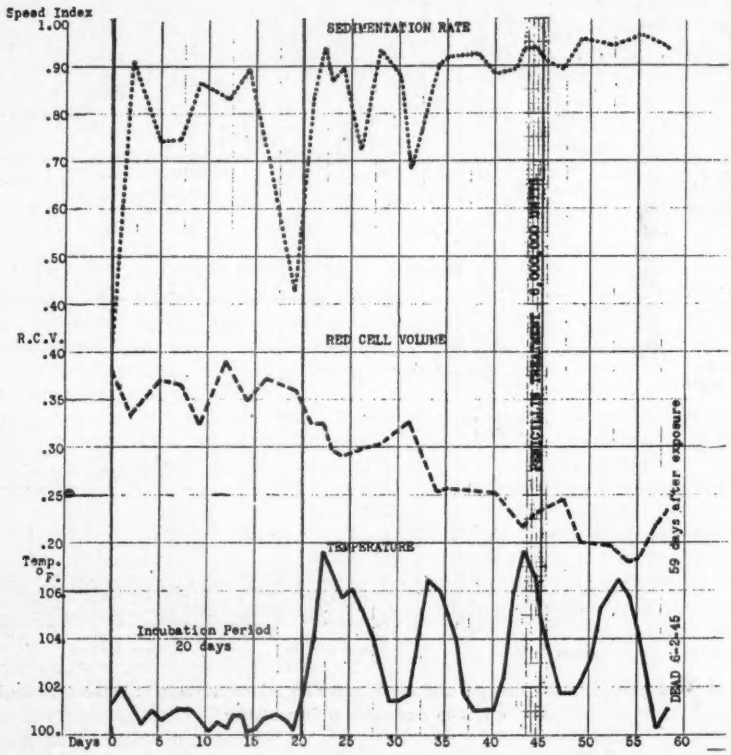

Fig. 2. Record of sedimentation rate of red blood cells, red cell volume, and temperature curve on infectious anemia horse 1379

Sedimentation rate..... Red cell volume ----- Temperature ———

Discussion

At the time of penicillin administration the case of swamp fever was almost at the peak of its third temperature reaction; the red cell volume had dropped from a maximum of 39% to 22.5%. The sedimentation rate was rapid with a speed index of 93.3 (Fig. 2). Whole blood drawn for serum contained an excessive amount of chicken fat clot from which very little serum would separate, and the animal had lost approximately 100 pounds in weight. However, he continued to eat part of his ration and drank from two to three gallons of water daily.

The penicillin was administered intramuscularly at an average rate of approximately 375 units per kilogram of body weight per hour. The first dose of penicillin consisted of one million units, or approximately 2,500 units per kilogram of body weight. One hour after this dose the blood contained 0.5 unit per cc; however, in four hours the blood level had dropped to 0.125 unit per cc. At this time 250,000 units more penicillin were administered. One hour following this dose the blood level of penicillin was 0.250 unit per cc. This level was still maintained at the 6th hour when 250,000 units of penicillin were again given. Two hours later, 8 hours after the first treatment, the blood level was 0.125 unit per cc and 500,000 units were given. This dose was repeated at 4-hour intervals until the 40th hour when administration of the six million units was completed.

Most of the blood samples for assay were drawn four hours after each penicillin treatment and at 4-hour intervals after the last treatment to determine the minimum blood level maintained. These 4-hour, post-treatment serum samples, collected after the 12th hour of treatment, all contained less than 0.125 unit per cc on assay (Fig. 3). However, the fact that the test was not sufficiently sensitive to detect below 0.125 unit per cc resulted in almost complete negative assay findings for this period. However, one sample collected one hour after the 20th hour of treatment contained over 0.125 unit, and urine samples contained sufficient amounts to indicate that

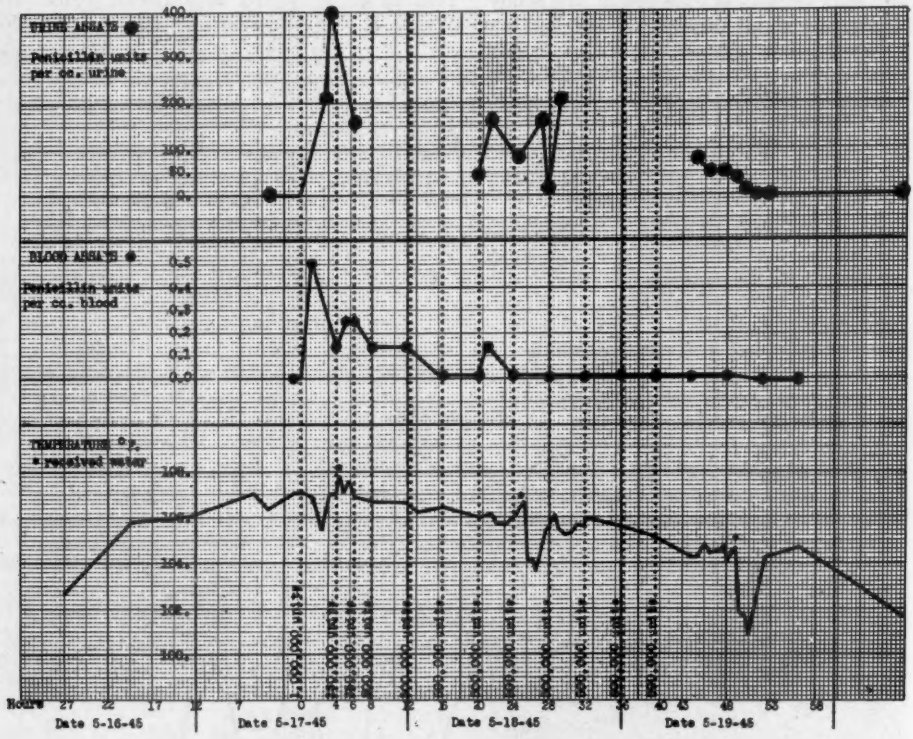

Fig. 3. Record of urine assays, blood assays, and fever curve on infectious anemia horse 1379 during and subsequent to treatment with penicillin

some of the drug was present in the serum.

The urine samples for assay were collected at irregular intervals during each day of treatment and one day following treatment; however, no samples were collected at night. The assays gave the number of units of penicillin per cc of urine in the various samples collected, but there were too many variables to take into consideration for accurate correlation between the drug's administration, blood level maintained, and urine elimination.

The rate of penicillin elimination in the urine was very rapid. The first post-treatment urine assay, made on a sample collected two hours 45 minutes after treatment started, showed over 200 units per cc and the maximum urine concentration recorded during treatment was obtained 30 minutes later or three hours 15 minutes after treatment started, at which time the assay showed over 400 units per cc. This maximum penicillin concentration was about 800 times the maximum penicillin blood-level concentration of 0.5 unit per cc, obtained from a serum sample collected about two hours previously. During the course of treatment the concentration of penicillin in the urine varied from 12.5 units to 400 units per cc. This wide fluctuation was partially accounted for by the rapid elimination following each repeated administration of the drug and by dilution from drinking water (Fig. 3).

After penicillin treatment was completed, the drug concentration in the urine gradually diminished from 80 units per cc in a sample collected four hours 35 minutes after treatment was completed to 0.125 unit per cc in the fifth post-treatment sample collected 10 hours 15 minutes after the last treatment.

The penicillin concentration assays of the urine in this test did not give an accurate index of the amount of the drug eliminated in the urine nor an accurate ratio between the blood and urine levels. However, it does indicate the presence of penicillin in the blood and the time when elimination from the blood was completed.

The animal showed very little if any beneficial response from the penicillin during the course of treatment or following the drug's administration. The temperature of the third reaction dropped 1.6° F. within two hours after the initial million unit dose but rose again within two more hours and continued to ascend even after the animal was watered (Fig. 3). The temperature then receded for three days as it was expected to do without treatment and within two more days promptly started on a fourth reaction (Fig. 2). The red cell volume slowly rose about 3%, then dropped to a new low of 18%. The speed index for the sedimentation rate increased to a new high of 96.2 and the chicken fat clot still persisted in drawn whole blood. The animal gradually became more depressed and continued to lose weight (Fig. 4). Twelve days following the completion of the drug's administration the animal became so weak he could no longer stand and died two days later on June 2, 1945, of acute swamp fever.

Summary

An experimental acute case of infectious anemia was produced, for penicillin treatment, with a particularly virulent strain of virus which had produced acute cases in 22 exposed horses, 20 of which had died.

The infectious anemia virus used was 5cc of lyophilized whole blood which had been stored for 32 months at room temperature.

The exposed horse showed the usual clinical symptoms of acute swamp fever. In addition, two noteworthy hematological observations were made: first, the speed index of the sedimentation rate, which was high (90) during most of the incubation period, dropped for six days to 43 before the first temperature reaction and then rapidly went up again; second, the amount of chicken fat clot increased and the serum decreased to the point where practically no serum could be obtained even following centrifugation. This factor appeared to be associated with the temperature reactions as the amount of clot increased as the temperature receded and decreased as the temperature rose.

Penicillin treatment was started 23 days after the horse showed evidence of infection during the third temperature reaction, at which time the progress of the disease as compared with other similar cases indicated that death would follow unless some beneficial treatment could be given. Six million units of penicillin were administered intramuscularly over a period of 40 hours at an average rate of 375 units per kilogram of body weight per hour. An initial dose of one million units was followed by injections at the rate of 500,000 units every four hours.

The horse showed no response to treatment other than becoming slightly more alert with a drop in temperature of 1.6° F. about two hours after the initial treatment, after which time he became progressively worse and died 14 days following the last treatment.

The penicillin assays of the blood serum showed a maximum concentration of 0.5 unit per cc one hour after the initial million unit dose. The minimum blood level maintained was below 0.125 unit per cc but was undetermined because of a lack of sensitivity of the assay tests.

Penicillin assays of the urine indicated very rapid elimination with a wide fluctuation in concentration—from 12.5 units to 400 units per cc. The last trace of the drug was eliminated between the 10th and 11th hours following the last 500,000 unit treatment.

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The Teeth of Horses

The grinding teeth of a horse are beautifully and elaborately adapted for dealing with the tough grasses that he consumes. They are peculiar in three ways. First, they are all alike, instead of the true molars being more complex than the premolars, as is usual. The premolars, we may remark in passing, are those grinding teeth which have predecessors in the milk dentation; the molars have not.

Secondly, these quite similar molars and premolars of the horse all have an extremely complicated surface pattern. Before they cut the jawbone they are covered with hard glossy enamel, rising up in ridges round a couple of deep cavities. These cavities later get filled up with cement, a substance not quite as hard as enamel, which is secreted by special glands as the tooth breaks through the gum. Under the enamel is the softer dentine.

Use soon grinds off the top of the teeth, with the result that their tops become nearly flat, but as the three materials wear down at different rates, sharp edges of enamel stand up a little beyond the cement and a little higher above the dentine. The whole forms a remarkably effective miniature millstone, with the advantage over our millstones that it keeps its grinding edges sharp as it is worn down.

The third point about the teeth is that they are of remarkable depth and that during the first eight years of life they have no closed roots, but go on growing from below, like a rabbit's front teeth, as they are worn away above. After these roots are formed, new growth ceases and the teeth are simply pushed up to compensate for the wear at the surface till they are all worn away and the animal dies because it cannot chew its food.—*H. G. Wells.*

Hamsters Supplant Horses

The golden hamster, *Cricetus auratus*, is said, on good authority, to be the world's fastest breeding mammal. Possessing a remarkable capacity for reproduction and an omnivorous appetite, and being of small size and very hardy it is not surprising that this little rodent has achieved great popularity of recent years as a laboratory animal. That it should replace worn out horses on fur farms, justifies some surprise.

The fur industry views with concern the increasing demand and dwindling supply of horse meat, but one enterprising fur rancher, McNeeley, tells in the *American Fur Rancher* of his novel solution of the problem of meat scarcity for his mink. He raises hamsters which will eat anything a rat will eat and feeds his mink on them.

A hamster of four to five ounces is just the proper daily ration for a mink. It constitutes a "one a day brand" of vitamins, hormones, minerals, proteins, fats and carbohydrates since the mink eat the entire carcass and the intestinal contents. Hamsters require very little attention; kept on hardware cloth the cages do not require cleaning. They can be given food to last several days at one time. One requirement in winter is that they be kept where the temperature is above 50° F., or they quit breeding and hibernate.

The female hamster will mate at 23 days of age but Mr. McNeeley doesn't breed his till they are 43 days old. The gestation period is 16 days. He breeds to produce one litter a month ranging from two to 16 young. After a female has produced 10 litters he sells them for children's pets. When, as sometimes happens, the amazing reproduction of his hamsters exceeds the capacity of his mink to consume the offspring, Mr. McNeeley finds a ready market for his surplus among laboratories.

A Practitioner's Evaluation of Modern Therapy in the Treatment, Control and Eradication of Bovine Mastitis

By J. X. PARENT
Foley, Minnesota

IN WRITING this article, my sole motive is to help fellow practitioners benefit from such of my experiences as may be useful. This discussion is limited to the personal experience and observation of the writer, supplemented by the reports of herd owners, in more than 1000 cases of mastitis that have been treated during the past two years. I do not claim any special merit for my treatment but, if the outcome in this rather large number of cases of mastitis and in the variety of problems they have posed is an indication, there must be merit in the methods described.

More specific chemotherapeutic agents necessitate more scientific procedure by the practitioner to determine specific causes. Further improvement in the therapeutic agents will demand still more precise diagnosis. I can see great advantage in clinics being set up by young practitioners with an associate technician. If smooth working organizations of this type can be evolved, it will produce more rapid advancement in clinical veterinary medicine than the profession has ever known.

In this discussion mastitis will be classed as acute or chronic and consideration limited to *average* cases, not the exceptions.

Acute Mastitis

Almost all acute mastitis is caused by infection or trauma, or a combination of both. In these cases, other things being equal, the severity of the attack naturally varies with the stage of lactation, or the proximity to parturition. The size of the udder is also an important factor. A large Holstein udder is generally more liable to a severe attack than the udder of an animal of a non-dairy breed.

A foremost cause of severe acute mastitis is the Streptococcus. Generally the history will be that the cow acted normally at one milking and at the next was severely ailing. Usually there is little rise in temperature and sometimes the temperature is subnormal. The picture is that of profound toxicity with which every practitioner is familiar. The trouble is usually confined to one quarter but may involve two. As the condition develops, the affected parts become necrotic with a serohemorrhagic exudate. A line of demarcation forms between the dead and living tissues. In my experience, no chemotherapeutic agent has been helpful in these cases. Supportive treatment helps prolong the cow's life until the toxicity subsides. The course generally runs about three to five days, after which improvement is shown. If not removed the necrotic portion will slough away of its own accord in about two weeks. I have amputated the udder completely in some cases that seemed hopeless. Some made remarkable recoveries; in others perhaps the operation just hastened the end. In some cases I amputate only the teat; in others I curette out a considerable portion of the necrotic tissue, pack the cavity with hot oxidizing agents and have the owner change this dressing frequently.

I have not been able to do much with acute mastitis due to colon organisms. In these cases, the severity of the attack and the outcome depend greatly upon the stage of lactation and size of the udder. Judged from clinical observation, the use of aqua flavine solution, given as infusions, at times gives good results. The injection is 250cc (1:1000) massaged up into the ramifications of the udder, allowed to remain 15 minutes, then milked out. The injection is repeated immedately and milked out in an hour. However, in my opinion routine udder infusion in cases of acute mastitis is contraindicated.

The habitat of animals suffering from acute mastitis should be carefully considered and hygienic measures instituted to assure the warmth and comfort of the patient. This is a routine that should be invariable. Cold floors with insufficient bedding have a particularly bad effect on these cases. Generally, the animals are off feed, but if they are eating, the feed should be low in protein.

Acute cases due to *Streptococcus agalactiae* and some of the other streptococcic and staphylococcic infections respond nicely to sulfanilamide orally. In most cases, however. dormant infection will persist in the udder and must be considered chronic mastitis in this stage and handled accordingly.

Chronic Mastitis

Chronic mastitis is a herd condition that requires considerable coöperation on the part of the owner if the veterinarian is to achieve satisfactory results and, unless he is assured of this coöperation, he should not undertake its treatment. In this area, most cows freshen before January and are fed heavy protein rations. Naturally the most troublesome time so far as mastitis is concerned, is during the season that the animals are housed. In the past few years, the shortage of labor has caused most dairy farmers to install milking machines. Few farmers know anything about these machines, many of which when improperly used are conducive to flare-ups of dormant infection and the spread of the disease from cow to cow. This and ignorance f sanitary requirements, necessary to control infection, have resulted in considerably more mastitis than was encountered previously in my practice. Of course, these flare-ups in themselves are acute mastitis and are treated as such, but we must not be diverted by them from the underlying condition, which is chronic mastitis of the herd.

The strip cut is used, the thybromal test made, the cow milked, the physical examination made

It was soon obvious that just treating clinical cases without instituting control measures gave unsatisfactory results. Therefore a policy was adopted of having a definite understanding of procedure with each dairyman who requested treatment. If he is not willing to have his herd as a whole treated instead of just the individual cases as they flare up, I am too busy. I require that the herd be submitted for a general check-up; that parts of milking equipment that may be possible sources of infection, be kept in lye solutions between milkings; that the teat cups be rinsed in a chlorine solution after use on each cow; and that, at least, the cows teats should be washed with a chlorine solution and dried immediately before milking. The part of the floor that the cows udders contact should be disinfected at regular intervals. I recommended that the floors be limed at least once a week. Stalls that are too short for large cows to lie down without compressing the udder or injuring the teats should be corrected. Bedding should be sufficient to keep udders off the bare floor. The milking machine should be operated according to the manufacturers instructions and, with few exceptions, milking time should not exceed three to four minutes. The barn entrances, yards and pastures should be void of conditions that could cause injuries to teats and udders and manure piles should not be allowed to collect in corrals. One can determine, to a great degree, how much coöperation he is securing and how many of the necessary precautions are being taken, by listening to the dairyman's conversation.

A bacteriological examination of the milk from each quarter is highly desirable and sometimes indispensable. However, because of the difficulty in getting the job done, and also the time factor, I have relied upon the use of a strip cup, the thybromal test and physical examination. At milking time, the cow's teats are washed. The strip cup used, followed by the thybromal test, the cow is milked and then the physical examination is made. After some experience and careful observation, it is surprising how few cases will be missed by a physical examination alone. A bacteriological examination, as a means of determining the extent of infection in a herd, is so useful that, when it is not available, there is a tendency to lie down on the job. That is a wrong attitude. Much can be learned by skilled physical examination of the udder. Support of the findings upon physical examination by the strip cup and thybromal tests gives an added confidence to one's diagnosis. The advantage of having laboratory facilities always at hand affords one of the best reasons for the maintenance of a coöperative clinic by a group of practitioners.

A milking order is important. The old chronic cases with fibrosis, of a nature that may hold encapsulated pockets of infection, should be eliminated from the herd. The alternative is to place them in a group to be milked last. Such cases are likely to have two or more quarters affected. The cows with udders under treatment should be placed next and clean cows kept at the head of the milking line.

Before penicillin was available, affected quarters were infused with a 30% suspension of sulfanilamide in oil, using 40 to 140cc per quarter. A small dose repeated every 24 hours is more effective than a single injection of this

size but entails greater expense to the owner. A large dose can be infused into the infected quarter and massaged well into the udder. A check on results is made in two weeks and remaining infections are followed up with three or four small daily infusions. On a subsequent check the results are generally gratifying.

Since penicillin has become available, I use it in 25,000 to 50,000 unit dosage in 150 to 250cc of distilled water. As penicillin must contact the organism, the greater volume of excipient is desirable to insure wider distribution of the product. A check of cases selected for this treatment usually shows 90% recovered in two weeks. I do not mean that all testing clear to thybromal and the strip cup are freed of infection but, in my experience, the percentage that relapse is small. The cases that recur may be either cows with highly susceptible udders, or simply reinfection. Proper sanitation of floors and equipment is necessary to avoid frequent reinfection.

I have not used sulfanilamide or penicillin in affected dry quarters, as silver oxide had done a satisfactory job for me, before either of the other medicaments were introduced, and I have continued to use it with satisfaction.

Summation

Penicillin is more effective than the sulfa drugs as an infusion treatment for chronic mastitis, especially in cases of staphylococcic infection.

For infusions, have as many sterilized teat tubes as there are quarters to be treated. Keep them in undiluted roccal in a wide mouthed jar. Cleanse the udder with chlorine solution and dry, touch up the end of the teat with one of the dye antiseptics before inserting the teat tube. Pick up the tubes with forceps and rinse in two separate hot water solutions before inserting.

An intravenous outfit is useful in penicillin infusions when the larger volume of solution is used.

Keeping a written record of each cow's udder provides useful information for future treatment.

Have proper equipment—racks, trays, towels and—don't use the barn floor as a table. In using sulfa drugs orally, be sure no sulphate has been given and see that the water supply is adequate. A little soda is desirable. About 15% of chronic mastitis cases are incurable. These should be picked out, as far as possible, by physical examination and no time wasted on them.

If infection is present in a herd, heavy protein feeding to force production is dangerous.

It is of the utmost importance to gain the coöperation of the dairyman. His share in the work of mastitis control and eradication comprises maintaining proper sanitation of his barn and equipment, providing for the comfort and care of his animals, removing sources of injury to his cows and observing a correct milking order and clean milking methods. Supplying explicit directions for the foregoing and the treatment of these cases is our obligation. Mastitis affords the veterinary profession an opportunity of service to the dairy industry.

Except the veterinarian institutes effective methods for stopping the spread of infection in a herd he will make little progress in handling mastitis, for new cases and cases of reinfection will chase him right down the milking line—never far behind.

Clean cows should be placed at the head in the milking line, followed by those with udders under treatment. Chronic cases of fibrosis that may hold encapsulated pockets of infection should be eliminated or placed in a group to be milked last

The Relationship of Vitamin C to Wound Healing

J. LAVERE DAVIDSON, LT. COLONEL, VC
Sioux Falls Army Air Field
Sioux Falls, South Dakota

WHILE it is generally agreed that domestic animals do not require vitamin C in their rations, it has been shown that, under certain conditions, an ascorbic acid deficiency does occur. Domestic animals synthesize vitamin C but in certain pathologic conditions or in the presence of trauma, apparently the rate of synthesis is much less than the amount utilized. Recent biochemical and nutritional studies have shown that the most significant and practical of these studies is the importance of vitamin C in wound healing. Surgery depends as much upon the action of tissue to regenerate and repair itself as it does upon good surgical technic, therefore, veterinarians should be as much concerned about the procedures that favor wound healing as they are about all the other phases that make up good surgery.

Normal Wound Healing.—In a wound such as a surgical incision, healing by first intension occurs by the formation of fibrin in the small amount of exudate and blood that seeps into the small area remaining after the wound edges have been sutured. Fibrinogen, which is normally present in plasma, also is present in the wound exudate. This fibrinogen is converted into fibrin by a fibrin ferment which has been liberated by blood platelets and by tissue cells which have been severed by the scalpel. This fibrin serves a dual purpose in that it acts as a framework for the subsequent growth of young fibroblasts and also as a means of keeping the wound edges together for the first few days after surgery is completed. The tensile strength of the wound during this early period is slight, but increases as the fibroblasts and the product they secrete, collagen, fill in the surgical area. Tissue cells which have been destroyed or damaged by surgical injury are believed to liberate substances that attract phagocytic white blood cells, and other substances that stimulates multiplication of fibroblasts and the formation of new capillaries. These new capillaries are outgrowths of pre-existing capillaries and venules. The endothelial cells of these vascular structures multiply to form pointed buds. The bud grows until it meets another bud or capillary and when the central portion becomes hollowed out, circulation becomes established. Some may remain as capillaries, while others may enlarge and become transformed into veins or arteries. This mass of growing capillary buds and fibroblasts is referred to as granulation tissue. The process of replacing the exudate or filling the wound crevice with granulation tissue is called organization.[1]

Formation of Intercellular Collagen.—During that stage of organization when the young fibroblasts are beginning to form into true connective tissue cells, collagen fibrils begin to appear in the intercellular spaces which have been filled with a liquid protein. This liquid protein apparently lacks the ability to gel. Collagen, a long-chain, protein molecule with carbohydrate and ascorbic acid linkages, forms the common substructure of bone and cartilage as well as of connective tissue. The basic function of collagen is to supply an organic matrix and to maintain the tensile strength of tissues. Although the fibroblasts and their mature forms, the connective tissue cells, play a part, it is mostly to the collagen fibrils that the healing wound owes its tensile strength, which increases markedly and progressively from about the fifth to the tenth post-operative day.

Last Stages of Healing.—With the filling in of the surgical area by granulation tissue, scar tissue formation begins. Some of the capillaries disappear. The connective tissue cells decrease in size, while their fibrillar strands become more numerous. When these cells shrink it pulls the original wound edges closer together so that the resulting scar usually occupies a smaller area than the original injured or surgical region. While this scar formation is under way, epithelization of surface wounds progresses by multiplication and the inward proliferation of cells from the surrounding skin margin.

Vitamin C and Collagen Formation.—The lack of formation of intercellular collagen is believed to be an important item in failure of wounds to heal.

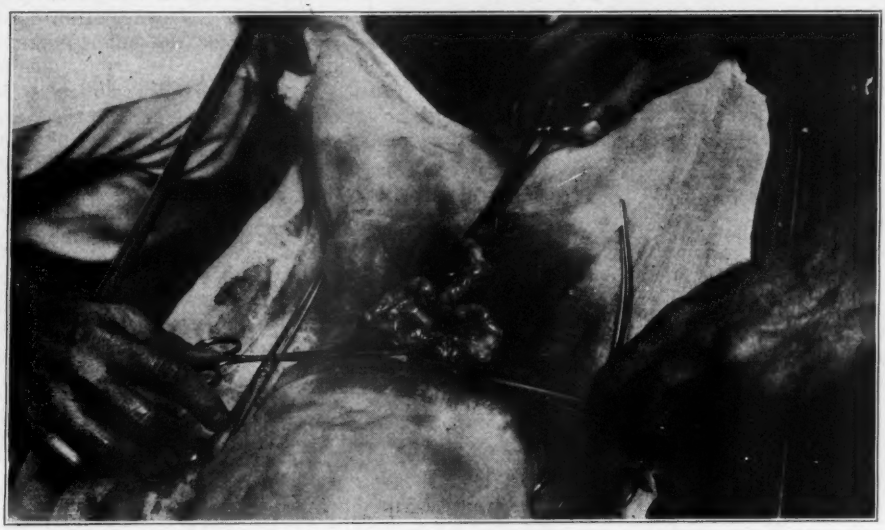
It has been found that the formation and maintenance of collagen depend upon adequate supplies of vitamin C. The mechanism involved is as follows: vitamin C acts directly upon intercellular substance causing it to gel and become converted into fibrillar collagen and in the absence of this vitamin a fluid substance that lacks the ability to gel remains in the intercellular spaces. It is also felt that a lack of vitamin C causes the fibroblast cells to secrete a homogeneous freely flowing abnormal product.[2] The transformation of intercellular material is under the absolute control of ascorbic acid. If vitamin C is completely removed the homogeneous fluid intercellular substance and the fibroblasts are present but fibrils and collagen are *not* formed.

In wound healing failure of collagen formation may be the only deviation from the normal process in borderline vitamin C deficiency without other detectable signs. Therefore, granulation tissue cannot develop and grow into and replace the wound exudate. The wound is not filled in and its edges remain separated.

Tensile Strength of Surgical Wounds.—Complete failure of granulation tissue due to an absence of vitamin C is quite apparent and presents no diagnostic problem. On the other hand a borderline deficiency because of the availability of vitamin C in subnormal amounts may be apparent only when wounds rupture due to a lack of tensile strength. Studies to determine the cause of gaping surgical wounds and a failure of healing indicated that a nutritional derangement was present. More than 20 years ago it was found that in hypoproteinemia wound healing was poor. Adequate protein must be available for the proper regeneration of tissue cells. It has also been shown that, in addition, vitamin C is essential for the development of tensile strength in healing wounds. It has been demonstrated that normal tensile strength does not develop in a period of 30 days, in animals maintained on a low vitamin C diet.[3]

It has been observed that following surgery in small animals, a drop in the vitamin C level occurs. It is believed to be caused by the utilization of this vitamin in the process of wound repair. It was this writer's experience in canine surgery in vitamin C deficient individuals that, in many cases, after four to seven days, the skin over the wound appeared well healed but the deeper structures showed no healing. The gaping wound edges required further suturing to bring them into apposition.

Surgical Importance of Vitamin C.—In surgery it is equally as important to provide the material required by cells for their repair and regeneration as it is good surgical technic. Careful suturing holds tissues in apposition and bandaging and good care favor healing by reducing motion and tension. These procedures alone become meaningless if nutritional demands of the regenerating tissues are neglected. The maintenance of good tensile strength of the surgical wound is especially important in veterinary surgery.



Patients suffering from pyometra usually exhibit low vitamin C. Administration of normal serum and vitamin C before hysterectomy is advisable

In small animal patients with chronic disease conditions, such as pyometra, endometritis, carcinoma of the mammary glands, etc., it has been found that with very few exceptions they show low vitamin C and low blood protein values. Administration of normal serum and vitamin C to such patients is advisable. Vitamin C in these instances plays an important role in the healing of soft structures. In administering ascorbic acid to small animal patients the dosage varies from 50 to 200 milligrams daily, depending upon the breed of animal and its nutritional condition.

References

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2. Dalldorf. *J.A.M.A.*, 111, p. 1376. 1938.
3. Lanman & Ingallis. *Am. Surg.*, 105, p. 616. 1937.

Clinical Reports

Homoplastic Osteoma of Frontal Bone of Mule

A six-year-old, pack mule was brought in for treatment. There was a swelling medial and dorsal to the right orbit which the owner stated had steadily increased in size since he bought the mule six months previously. No history of injury was available.

The swelling extended outward about three inches from normal position of the parts with a circumference of nine inches. The swelling was hard and non-fluctuating and was diagnosed as an osteoma of the frontal bone. As the condition was deemed a benign one, the owner was advised that no serious condition would result if the tumor was not removed. However, for the better appearance of the animal he wished to have it removed.

A wire saw was used to remove the osteoma which extended out about three inches from the normal surface

The area was shaved and the animal was given 15cc pentobarbital sodium intravenously. Also a local anesthetic of 1% solution of procaine hydrochloride was used. A midline incision was made over the tumor and the skin and underlying connective tissue was dissected from the osteoma to its base. A wire saw was used to remove the osteoma. The lateral flap of skin was removed, the medial flap sutured down to cover the area and a pressure pack of sterile cotton applied.

Three days later the pack was removed and a camphor antiseptic applied to the wound. This antiseptic was applied daily throughout the healing period. The stitches were removed in eight days—11 days following the operation.

An uneventful recovery followed and the animal was taken home six days later.

GERALD D. GOETSCH

Springfield, Illinois

Squamous Cell Carcinoma Involving the Facial Sinuses and Air Passages in a Horse

During my senior year in school at the Kansas State College the head of a sixteen-year-old gelding, belonging to Colonel Tuttle who was stationed at Fort Riley, was submitted to the veterinary clinic by Captain Wm. G. Love, V.C., for post-mortem demonstration. The horse was well known thereabout for its acrobatic ability and his owner often put him through his paces for the entertainment of the public.

In July, 1944, the horse was noticed to have a slight nasal discharge from the right nostril which progressed in intensity as the months went by. During the beginning of November the condition became bilateral and the animal showed a decreased adeptness in carrying out his performances. About that time an exophthalmus of the right eye began to appear. Blindness of that eye developed and by the middle of December the horse was totally blind. Until this time the horse was still able to perform since his owner used only visible signs in directing him through his various acts.

On January second an unsuccessful attempt was made to pass a stomach tube through each nostril. Some days previously the horse had some difficulty in respiration. The animal was, as the humane organizations say, "put to sleep."

On post-mortem examination an irregular shaped mass of neoplastic tissue 1½ by 2 inches was exposed where the soft palate was severed in removing the tongue. The posterior nares were practically occluded with an irregular shaped mass of neoplastic tissue which accounted for the difficult respiration, observed for the few days preceding euthanasia. The maxillary sinus in front of the right eye was well filled with irregular masses of neoplastic tissue. They extended under the orbit but did not entirely fill the sinus. The tumor mass completely filled the posterior part of the upper air passages on the right side. The right frontal sinus was completely filled with the tumor mass. This extended through the posterior nares to the left side where there was still a small opening for the passage of air and there was also an opening in the left maxillary sinus although there was an abscess under the left eye in the superior part of the posterior maxillary sinus.

The neoplasm surrounded the right optic nerve and eroded the floor of the cranial cavity although no gross lesions were observable in the brain substance or on the dura. No me-

tastasis to the lymph glands of the head were found.

Histologically the condition was a squamous cell carcinoma. The epithelial cells were embryonic as evidenced by their large size and the presence of numerous mitotic figures. These proliferating cells appeared in large groups and such groups were separated by stroma. The neoplastic cells were not confined to the mucosa but infiltrated through the underlying tissue in the direction of least resistance.

A. RIEGG

Asheville, N. C.

Gastroenteritis Due to Drinking Kerosene

A red heifer calf, three months of age was brought to the clinic with the following history:

Three days previously this bucket-fed calf broke out of its pen and a gallon of kerosene, that had been drained from the truck radiator (used as antifreeze), disappeared. The calf was apparently normal and drank its milk as usual that night. The odor of kerosene was noticed in the barn that night, but it was thought probably the children had spilled it. The next morning the calf was in extreme pain. The owner immediately drenched it with one cup of linseed oil; followed three hours later with another cup of linseed oil; then in the evening he gave five ounces of magnesium sulphate. He induced the calf to drink three pints of milk from a bottle that day and two pints the next day. The following day the calf would not drink at all and it was brought in for treatment.

When presented at the clinic the calf showed the following symptoms: Diarrhea with strong odor of kerosene on the feces; incoordination of movements, grinding of the teeth, amaurosis, temperature 102.8° F. fast pulse, respiration 80 with the odor of kerosene strong on the breath. The mucous membranes showed some evidence of toxemia. There was complete anorexia.

The condition was diagnosed as a toxemia and gastroenteritis due to the excessive dose of kerosene. One quart of carron oil (3 parts calci hydroxii, 1 part olei lini, and 2 parts mineral oil) was given as a protective. Food was withheld until the following day when milk and water was allowed.

The following day the calf showed some improvement with the temperature at 102.5° F. and the respirations slowed to 65. A more thorough examination of the eyes made with an ophthalmoscope disclosed a continual shimmering of the vitreous body to the extent that all vessels appeared blurred.

The third day of treatment showed further improvement and considerable less shimmering of the vitreous body, plus indications of returning sight. The next day the calf appeared about normal and the case was discharged.

Three weeks later the owner reported that the calf showed considerable thirst at first, but except for a little cough, had eaten well and "come along fine."

In reviewing considerable literature I have been unable to find satisfactory information regarding this shimmering condition, in the vitreous body. How often or under what condition does it occur? Has anyone anything to report?

CLARENCE A. LOVE

Nowata, Okla.

Streptococcic Septicemia in a Greyhound

The carcass of a greyhound bitch was presented for autopsy and rabies examination.

History.—She had been noticeably sick for three days, becoming progressively worse from the onset. The symptoms shown were stiffness, temperature of 106° F., dullness and tendency to remain comatose. The morning of the third day she was blind and unable to swallow. The latter symptom was the reason for the request of a rabies examination.

Lesions.—Digestive system: Active hyperemia of mucous membranes and several erosions in fundus of the stomach, hemorrhagic catarrhal enteritis and numerous tapeworms.

Liver: Extensive parenchymatous hepatitis.

Spleen: Congestion and enlargement (approximately one and one-half times normal size).

Kidneys: Numerous hemorrhagic infarcts and cloudy swelling.

Circulatory System: Petechiae of endocardium and albuminous degeneration of myocardium.

Lymphatic System: Active congestion of hepatic, mesenteric, renal, and iliac lymph glands.

Nervous System: Encephalomyelitis with numerous petechiae on cerebral hemisphere, particularly of Ammon's horn. Microscopic examination for Negri bodies was negative, however, numerous streptococci were observed in the preparation.

Laboratory Examination.—The brain, spleen and kidney were the tissues selected for culture. Initial isolation was performed on blood agar plates which yielded numerous small,

glistening, beta-hemolytic colonies. On further study these organisms proved to be a Lancefield C, beta-hemolytic streptococci.

Organisms prepared for animal inoculation were grown in glucose enriched, meat-infusion broth for 24 hours. The organism apparently was non-pathogenic for rabbits and guinea pigs, when injected subcutaneously, so mongrel pups were selected for inoculation. Broth cultures of the organism given orally and subcutaneously failed to produce the disease. Later four animals were given 2 to 5cc of the culture intravenously.

Of the four animals inoculated, only the one receiving the 2cc dose developed the infection and succumbed on the twelfth day. Each of the three surviving animals was given 10cc of the culture intravenously one week later to determine whether or not they were susceptible if given a larger dose. These animals were observed for another week and were entirely normal throughout this period.

Evidence of illness in the susceptible animal was not noticeable on the third day following injection and was very apparent on the fourth. The symptoms shown were extreme depression with a tendency to remain asleep. Extreme pain was evident when the dog was aroused and handled, as could be seen by the facial expression and the fact that the animal would yelp as if in great pain. Incoordination and dullness of vision were quite pronounced after the fifth day. Blood cultures were run on the ninth and tenth days following inoculation. Both samples yielded streptococci.

Lesions found on autopsy of the pup were practically identical to those described in the greyhound, however, hemorrhages were more pronounced and numerous throughout all the tissues of the body. The organism was again isolated and proved to be identical with the organism isolated from the greyhound.

Conclusion.—A strepococcic septicemia is rare in small animals to judge from the literature. However, numerous streptococci are often found in canine infections such as tonsillitis, abscesses and similar processes. The clinical picture noted in this case is fairly common and might pass for any disease involving the central nervous system.

No treatment was attempted in either of the affected animals, although, the use of the sulfa drugs supplemented by proper supportive treatment probably was indicated.

A possible mode of infection may have been through the lesions of the stomach as this pack of greyhounds were being fed on carrion, particularly the carcasses of horses which had died of unknown causes. The fact that only one greyhound was affected would tend to disprove this line of reasoning. However, variation in susceptibility of individuals was shown in the experiment and the lesions in the digestive tract would tend to uphold this assumption. Oral administration probably failed in the experimental animals due to pH of stomach. One must admit however that not enough experimental animals were involved to justify definite conclusions.

QUENTIN JEPPESEN

Greenleaf, Kans.

Surgical Repair of Teat Lacerations

Most of us, who have been engaged in large animal practice for some years, may recall disappointments encountered in our efforts to repair the many and diverse traumatisms of livestock. Sometimes the failures have seemed almost inexcusable, or, at least, such as to lead one to seriously doubt his craftsmanship as a surgeon. One such failure in my own experience, has been in my inability to obtain results approximately consistent or uniform in the surgical repair of injured teats in the cow.

One of the most common injuries to the teats of cows, in my field of the ubiquitous barbed wire fence, consists of lacerations penetrating the teat sinus and allowing more or less leakage of milk. Unless such wounds are closed the milk will continue to escape through the opening and prevent complete healing which in turn leads to a permanent fistula, thus ruining what otherwise may have been a valuable animal.

Suturing such wounds seems simple enough, yet in my experience it has not given satisfactory results. The cellular structure of the cows teat does not seem to lend itself to suturing, as readily as does that of many other tissues. Sufficient suture tension to stop the leakage of milk seems more than the tissue can endure, resulting either in outright stitch slough, or stretching of the suture openings allowing leakage via this route. Continued leakage keeps any protective dressings wet or otherwise messed up to such an extent that they cannot be kept in place, or if kept in place they add to the hazard of infection.

After many failures following suturing of lacerated teats, I have been, for some time, relying on the simpler methods found in taping which to date have given gratifying results. I do not wish to imply originality in the method or technic which has proved of value to me but, instead, I shall try to pass along as clearly as possible the technic which has given me better results than any other of the many tried. The following *modus operandi* applies only to fresh lacerations.

Not unlike any other attempted surgical procedure, cleanliness, as nearly asepsis as possible to attain, is of prime importance. My method is to first scrub the teat in its entirety with 70% alcohol by means of saturated cotton pledgets. Follow with ether in the same manner. Avoid entirely the use of water, including the use of any antiseptics requiring water as a diluent. It may be well to employ some form of nonirritating antiseptic on the lacerated tissue. My drug of choice is tincture of metaphen, applied lightly to the wound with a swab.

The next step is to prepare a strip of adhesive tape one inch in width and from five to eight inches in length. Lay the tape out on some clean flat surface with the gum side upward. Have at hand a small piece of fairly heavy paraffined paper from which cut two pieces a little wider than the tape, one piece to be about one inch in length, the other about ½ to ¾ inch longer. Stick these onto the tape at either end as in Fig. 1, the object being to prevent the tape from becoming stuck to itself while being manipulated into proper position around the teat. There should be a strip of exposed gum about three inches in length between the pieces of parafined paper depending on the circumference of the teat to be repaired.

Fig. 1. Adhesive tape with wax paper on ends

Bring the gum portion of the tape into contact with the teat with its center diametrically opposite to the laceration as in Fig. 2, and continue with it around the sides of the teat as in Fig. 3.

Grasp the taped teat from behind between the thumb and first two fingers and while squeezing the sides inward toward the laceration with the aid of an instrument (curved scissors will do) depress or partially invaginate the lacerated area between the thumb and fingers toward or into the teat sinus. While holding the invagination in place by pressure of the thumb and fingers, firm the tape into close contact with the sides of the invaginated portion and stick the two gum surfaces together below the paraffined papers. After the tape is firmly stuck together, slip a large paper clip astride the now double thickness of tape and press it downward firmly against the teat as in Fig. 4. Next remove the paraffined papers from the tape and, after sticking the remainder of the two gummed ends together it should be found that the end having the longer piece of paraffined paper will have a margin of gum extending somewhat beyond the other allowing the tape to be carried around still further and stuck down to the tape surrounding the teat. To insure that the fastenings will stay put, it is well to surround the whole with another length of adhesive, just sufficient to cover the exposed portion of the paper clip and stick down.

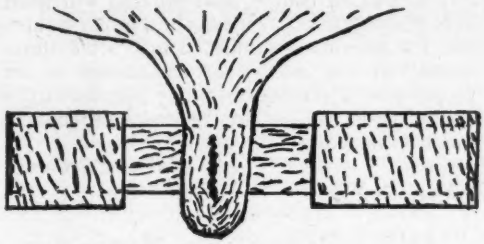

Fig. 2. Placing the bandage in position

While it is not necessary, perhaps, I find it advantageous to cover the whole with a few turns of the kind of gauze bandage that sticks firmly to itself, known by the trade name of "gripgauze" and sold in most drug stores. This gauze is water and moisture proof and serves very nicely, not only as further protection against contamination, but it makes a finished looking job.

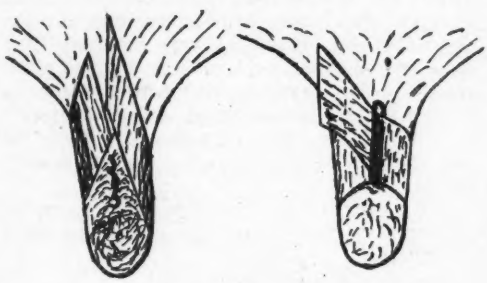

Fig. 3. Almost ready for the "gripgauze"

If all goes well, leave everything in place for a week or 10 days before removing the dressings which, by the way, may be done by any handy attendant, if necessary.

The main advantages of this method of repairing lacerations of the teat are:

1. It is practically painless and may be performed with a minimum of restraint.

2. It furnishes a practical method for repairing lacerations of teats in full milk production.

3. It works well and looks well and pleases the most meticulous owner of a good cow.

4. By invaginating the laceration, the surfaces are held firmly together and as the teat fills with milk, thereby increasing tension, there is no tendency to open up the cut: on the contrary, the more the tension the firmer the apposition of the lacerated walls.

It follows, of course, that milking will have to be accomplished by means of a milking tube, and the attendant should be instructed thoroughly in the matter of cleanliness in its proper use. It defeats the whole purpose of the operation if the quarter be destroyed by infection incident to the aftercare.

WILLIS WILSON

Dayton, Wash.

Making Professional Magazines More Useful

From my association with veterinarians, I am convinced that many of us fail to utilize, to the fullest extent, the information supplied by our veterinary periodicals and other veterinary publications. A simple system of recording that material so that I can find it on a moment's notice, has served me well.

As each publication received is read and mentally digested, I try to determine which articles are of value to me at the present and which are of probable value for the future. This will, of course, vary among veterinarians depending on the type of work in which they are engaged, their locations, etc. I make filing cards for those articles. This card is made up by the system usually used under "subjects" in our libraries. Two or more cards may be necessary for some articles, but one will usually suffice.

For example: In the November issue of VETERINARY MEDICINE, an article would be listed as follows:

Respiratory infections:

"Sulfonamide therapy with adjuncts in bacterial respiratory infections of the dog."

Veterinary Medicine, Volume XL, November, 1945, p. 373.

A record card would be made for this discussion reading as follows:

Drugs—Sulfonamide:

"Sulfonamide therapy with adjuncts in bacterial respiratory infections of the dog."

Veterinary Medicine, Vol. XL., Nov., 1945, p. 373.

I keep two files, one for discussions pertaining to large animals and one for small animal subjects. For the veterinarian who wants to pursue a subject even further, he can consult the references usually given at the end of the articles. The cards are filed alphabetically under the general subjects.

In the foregoing instances under "respiratory infections" and under "drugs" respectively. Often I find it necessary to consult certain treatments in a hurry and my filing system has been a great help to me many times.

This scheme of making cards for indexing the articles has been used by some veterinary practitioners for many years, but it isn't employed by nearly enough of them. Some of the material in our journals is of current interest only. This I do not index nor do I index subjects foreign to the problems of my particular practice. But every issue has material in it which will certainly be of permanent value to any veterinarian. I find detailed articles on anatomy and on surgical technics especially valuable. No one can remember all of such material that he reads. To profit by it, it must be available when the occasion arises for using it.

S. K. KIRK

Lubbock, Texas

Operation for Closed Teat Sphincter

An operation for closed teat sphincter in the milk cow may be of interest to those doing dairy practice.

After properly cleansing the teat, infiltrate a 2% procaine around the orifice using a ⅝-inch, 24-gauge intradermal needle. Usually 2cc to 3cc are needed. Next inject 0.5cc adrenalin to suppress bleeding. While doing this, an assistant should be "tailing up" the cow.

It is well to determine before making the injection how much tissue needs to be removed from the end of the teat by palpating the extent of the fibrous tissue. Then with a heavy scissors or sharp scalpel remove the whole end of the teat, sometimes as much as ½ inch of the end of the teat must be removed. Don't squeeze the teat on the first cut when using scissors to sever the end of the teat. Then take a pair of sharp pointed scissors and while squeezing the teat firmly, cut off enough of the everted sphintor muscle to allow the milk to flow in a gentle stream without milking. The operation should always be performed with the quarter full of milk.

As after treatment dispense a little sulfanilamide ointment to be used on the teat and apply a bandage made of two ordinary strainer pads. Place the teat in the center of the pads and bring up the sides, over the teat. Secure with tape around the teat. A clean one should be replaced after each milking for ten days.

This operation gives one a little trouble at first, but after some experience is acquired, it is highly successful. No plugs or dilators should ever be used.

K. E. LLOYD

West Bend, Wisc.

Book Reviews

Dairy Bacteriology and Public Health. A Handbook for Veterinarians and Milk Sanitarians. By *C. S. Bryan*, B.S., M.S., Ph.D., D.V.M., Professor of Surgery and Medicine, Michigan State College. 33 mimeographed pages; spiral bound. Published by Burgess Publishing Co., Minneapolis. 1945. Price $1.00.

This work is a syllabus, intended primarily as a basis for a course of lectures and demonstrations for veterinary students. It is well adapted for this purpose and should prove useful also to veterinary practitioners who serve small communities as part time milk or dairy inspectors and as a refresher course for any who contemplate taking up such work.

Although the text is mainly in outline form, many definitions are given and, by means of tables and abstracts, a surprising amount of information is conveyed in small space. Veterinarians engaged in dairy practice will find in this work many suggestions which will enable them to aid their patrons in meeting the requirements of milk inspection ordinances and regulations.

* * * *

Lander's Veterinary Toxicology. Revised by *J. A. Nicholson*, M.A., Ph.D., M.R.C.V.S., Professor of Biochemistry, The Veterinary College of Ireland. Third edition, 329 pages, illustrated. Alexander Eger, Inc., Chicago. 1945. Price $6.25.

The appearance after 18 years of a new edition of this work, unique in the field of animal poisoning, is welcome. For a number of years Lander's text has been unavailable and there was nothing that quite filled the important place it formerly held in veterinary toxicology.

The plan of the work is much the same as for former editions. Following an informative general discussion occupying 25 pages, poisons are discussed in the following classifications, mineral or inorganic poisons, organic poisons and drugs, poisonous plants, and chemical toxicology. This edition contains much new material developed or discovered during the past two decades. In the main the discussions are based upon information derived from the British Empire or European sources; there being scant reference to American veterinary or other literature. Yet little of the animal poisonings common in this country is omitted. Pitch poisoning in swine constitutes a conspicuous example of important omission. The discussion of cottonseed oil cake "poisoning" lacks considerable of being up to date as does also the text on sweet clover disease. The discussion of senecio poisoning does not fit its occurrence in this country.

The discussion of poisonous plants will be found lacking in many respects by American veterinarians, but that is not serious since many excellent U. S. Department of Agriculture and state experiment station bulletins are available on that subject as is also the complete work by Muenscher. However, in this work treatment is given for plant poisonings, a serious omission in Muenscher's otherwise excellent work. The section on chemical toxicology is intended only for toxicologists.

The remainder of the work, discussing as it does the forms, occurrence, toxicity, absorption, diagnosis, symptoms, post-mortem lesions, treatment and chemical diagnosis of a large number of poisons and poisoning in all domestic animals, comprises an important contribution to veterinary medicine. It will prove highly useful to practitioners and practically indispensable in forensic veterinary medicine. The price will seem high for a book of this size, but in view of the greatly increased cost of book manufacture at present we shall probably have to get used to a higher scale of book prices than heretofore.

* * * *

Manual of Veterinary Clinical Pathology. By *David L. Coffin*, V.M.D., School of Veterinary Medicine, University of Pennsylvania. Second edition; revised and amplified. 263 pages: illustrated. Published by the Comstock Publishing Company, Inc., Ithaca, N. Y. 1945. Price $4.00.

The first edition of this work was reviewed in these pages less than two years ago *(Vet. Med.*, 39:5, p. 221. (May) 1944). The text matter of this edition has been more than doubled and the mechanical production improved to make it a durable, attractive work.

The trend in veterinary practice is more and more to accurate diagnosis, made possible by various allergic, chemic and cultural tests, microscopic examinations and laboratory technics. Improved methods and better facilities place many of these aids to early and accurate diagnosis and consequently more successful therapy within the province of the practitioner. Tests requiring elaborate facilities and special skill and experience remain of course, a function of the biological laboratory.

This work is devoted to the trend in veterinary practice. It is a handbook of concise information on the most practical laboratory procedures in the diagnosis of animal disease and is for the clinician. Practical, everyday technics are given for tests and examinations the clinician can make for himself in the barn or in his office. There are included also clear directions for the collection, preservation and shipment of specimens that require elaborate equipment and special laboratory skill for examination. The title seems poorly chosen since the text is definitely a work on diagnosis, not

on pathology, clinical or general, and will prove the more popular for that reason.

For a detail of the contents readers are referred to the review of the first edition.

* * * *

Practical Dog Breeding. By *Harry C. Peake.* 158 pages. 33 illustrations. The Macmillan Co., New York. 1945. Price $1.95.

This little book will be a source of pleasure and assistance to every one interested in dog breeding.

There are chapters on the history of breeding, aims in breeding, selection of a breed, reproduction, heredity and the principles and practices of dog breeding.

It is based upon Doctor Peake's own experiences and is full of sound and profitable information, not only for the novice, but for the experienced breeder as well.

It is replete with details of those little things which mean much in the satisfactory handling of what might seem a difficult situation and it achieves compactness in the full coverage of the subject, without sacrificing any of the fundamentals.

This book is a guide and a reference, which can be recommened by small animal practitioners to their clients, who contemplate breeding dogs. It contains the advice that the veterinarian's expert service is essential at all times of difficulty. The warning of Doctor Peake: "Never lose sight of the fact that you are not a veterinarian," might well be placed on placards and hung in every breeding kennel.—*H. J. M.*

* * * *

A Treasury of Horse Stories. Selected and edited by *Margaret Cabell Self,* author of "Horses, Their Selection, Care and Handling" and "Fun on Horseback," etc. 368 pages, 4 colored plates. Published by A. S. Barnes & Co., New York. 1945. Price $3.75.

Some readers delight in anthologies; others prefer literary flowers of their own selection. Were all anthologies compiled with the care of this one their popularity would be much greater. The author has set as criteria for this collection: (1) every story must have literary merit, (2) it must contain stories from all kinds of places and countries and (3) stories of horses in every purpose for which the horse is used. As a result there are stories of thoroughbreds and standard breeds, draft and light harness horses, polo ponies and cow ponies, the fabled centaurs and Pegasus and the Houyhnhnms and steeds of Baron Munchauser.

Fantasy and folklore, hunting and polo races and runaways and horses old and young, each comes in for a group of selections.

Many of the old favorites are included. Famous rides include, Paul Revere's, John Gilpin's, and "How They Brought the Good News from Ghent to Aix." "Mazeppa" is unaccountably omitted. The races, of course, include Ben-Hur's chariot race; horse trading includes David Harum's trade with Deacon Perkins; polo the game of the Skidars and the Archangels and among other groups are the Red Pony, Florian and various others that are read and reread wherever lovers of horse-flesh are found.

The authors include: Shakespeare, Dickens, Kipling, Thackeray, Hawthorne, Washington Irving, Jonathan Swift, John Masefield, Longfellow, Cooper, Oliver Wendell Holmes, John Galsworthy, John Steinbeck, and many others scarcely less well known. There is many an evening's enjoyable reading in the nearly 400 large pages of "A Treasury of Horse Stories"—humor, pathos, drama, tragedy, and horse-lore all.

* * * *

Glycerin Its Industrial and Commercial Applications. By *Georgia Leffingwell,* Ph.D., editor, *Glycerin Facts and Soap Uses in Modern Industry* and *Milton Lesser,* B.S., technical editor, *Drug and Cosmetic Industry,* consultant Association of American Soap and Glycerin Producers, Inc. 259 pages. Published by Chemical Publishing Co., Inc., Brooklyn, N. Y. 1945. Price $5.00.

Since its discovery in 1779 glycerin has found its way into an amazing number of industries. More than 1500 uses are listed in this work with a large number of formulae for the preparation of glycerin containing products.

The major portion of the work deals with industrial uses of glycerin in adhesives, polishes, explosives, lubricants, plastics, paints, cosmetics, agriculture, photography, foods, beverages, etc. Chapters on its use in medicine and surgery, dentistry, pharmaceuticals and veterinary medicine will prove of greater interest to veterinarians. In these four chapters various formulae and therapeutic agents in which glycerin has a part are discussed.

The work is a comprehensive survey of the whole field of employment of glycerin and accords to medical uses its share of the discussion.

* * * *

Useful Bulletins, Etc.

Vitamin A Potency of Butter.—Bimonthly Bul. No. 236, Ohio Agr. Exp. Sta., Wooster.

The Penetrative Powers of Disinfectants.—Tech. Bul. 183, Michigan Agr. Exp. Sta., East Lansing.

Ventilation of Animal Shelters.—Cir. 219, Missouri Agr. Exp. Sta., Columbia.

Internal Parasites of Cattle.—U. S. Dept. Agr. Cir. 614. For sale by Supt. of Documents, Washington, D. C. Price 10 cents.

Effects of Penicillin on E. Rhusiopathiae Infected Pigeons.—Research Bul. 141, Nebraska Agr. Exp. Sta., Lincoln.

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Various sulfonamides have exhibited antibacterial action against many types of infection. Outstanding among these are—

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KEMVITE* (Sulfaguanidine and niacin) *Lederle*—provides the bacteriostatic activity of sulfaguanidine and at the same time supplies the B vitamin, niacin. It is particularly indicated in the control of necrotic enteritis of swine.

*Reg. U. S. Pat. Off.

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You'll Be Interested to Know That . . .

Poliomyelitis occurs mainly during the warm season. An experiment with mice conducted by Holtman of the University of Tennessee may indicate the reason. Mice acclimated to a temperature of 55.4° F. and inoculated with polio virus showed first symptoms of paralysis on the 11th day and 50% mortality on the 13th day. At 71.6° F. 50% of them were dead by the 7th day and at 89.6° F. by the 5th day. As the metabolism was lowered by heat the susceptibility to the disease increased.

■

Ontario Veterinary College to Give D.V.M. Degree

At the last meeting of the Senate of the University of Toronto on February 8th a statute was passed providing that commencing at the next graduation in May, students of the Ontario Veterinary College will receive the degree of D.V.M. Sometime early in June former graduates holding the diploma of B.V.Sc., of the College will be advised by the Registrar of the University as to the conditions entitling them to receive the D.V.M. diploma.

■

WANTED

MAY, 1945, issues of VETERINARY MEDICINE. Your subscription will be extended one month for each copy sent us.

Publication of Agricultural Yearbook to Be Resumed

Publication of the Yearbook of Agriculture, dropped in the war years, will be resumed during the coming year. It is expected that the first edition since 1942 possibly will be ready for distribution by the end of 1946. It will cover the period 1943-47. With the exception of these years, the publication has been issued annually since 1894, when the yearbook was first issued as a ready reference book for farmers.

Plans are for the 1943-47 yearbook to fit into the series begun in 1936. The tentative title selected is Science and the Farmer. Other books in the series are Better Plants and Animals I, 1936; Better Plants and Animals II, 1937; Soils and Men, 1938; Food and Life, 1939; Farmers in a Changing World, 1940; Climate and Man, 1941; and Keeping Livestock Healthy, 1942. Previous to establishment of this series the books carried no specific title and were largely statistical with only brief summaries of new developments in agriculture.

Featured in the coming edition will be achievements of agricultural science, particularly discoveries made during the war years. Examples of subects to be covered are: Feeding, breeding and care of livestock in the light of newer knowledge; new facts on soils, fertilizers, and microorganisms; insects, insecticides, and fungicides; new farm machines and processing methods; plant culture, growth regulators, and new varieties of crops; irrigation and hydraulics; household developments, new food preparations and new data on diets and home management.

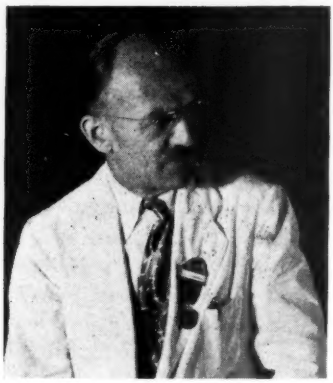
Australia, the source of most of the world's lanolin didn't have enough to grease the rifles.

■

Due to the scarcity of horse meat fur farmers in Newfoundland are planning on feeding whale meat.

■

Dr. R. L. Mundhenk



Doctor Mundhenk, OSU '16, died at Boulder, Colorado, January 13, 1946, of a heart involvement. He had been in poor health for more than a year and several weeks ago suffered a serious breakdown. He was on indefinite leave of absence at the time of his death.

Doctor Mundhenk had served on the veterinary faculties of the Ohio State University, the Alabama Polytechnic Institute and the Texas Agricultural and Mechanical College, and on the technical staffs of Abbott Laboratories and, since 1941, of Lederle Laboratories where he had a large share in directing the work of penicillin production.

Doctor Mundhenk served an enlistment in the Navy before he studied veterinary medicine. In World War I he served in the Infantry (lieutenant and captain), in the Field Artillery (major) and in the Signal Corps (major and lieutenant colonel).

■

Follow Directions Carefully When Using DDT

The National Safety Council warns that unless directions are carefully followed sure death to flies, roaches, fleas, and lice by DDT also can make trouble for the user if proper care is not taken to follow directions.

In spite of its inherent toxicity, there will be no danger to the user if these two essential precautions are taken:

1. Avoid inhaling the spray.
2. Avoid skin contacts with the substance, especially if it's mixed in an oily solution.

Take care to spray away from the face, and wear long-sleeved, high-necked clothing which will expose as little of the skin as possible.

While there is less hazard on the use of the powder form of DDT, the Council adds a note of warning on mistaking the powder for foodstuffs. Keep it in a well-labeled container.